Central Coast — Table of Contents

Tables

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Boxes

Central Coast Hydrologic Region

Central Coast Hydrologic Region Summary and Recommendations

Summary

This subsection contains a discussion of the following topics.

- [Highlights from regional report leading up to resource management strategies and policies.]

The Central Coast Water Board has developed and is pursuing the following measurable goals for the Central Coast Region, based on its vision of healthy watersheds:

1. Healthy Aquatic Habitat - By 2025, 80 percent of aquatic habitat is healthy, and the remaining 20 percent exhibits positive trends in key parameters.
2. Proper Land Management - By 2025, 80 percent of lands within any watershed will be managed to maintain proper watershed functions, and the remaining 20 percent will exhibit positive trends in key watershed parameters.
3. Clean Groundwater - By 2025, 80 percent of groundwater will be clean, and the remaining 20 percent will exhibit positive trends in key parameters.

The Central Coast Water Board recognizes the importance of healthy, functioning watersheds in the protection of water quality. Healthy watersheds function well ecologically and are sustainable; support healthy, diverse aquatic habitat; have healthy riparian areas and corridors; and have near natural levels of sediment transport and near natural levels and quality of groundwater.

Resource Management Strategies and Policies

This subsection contains a discussion of:

- [Priorities and implementation recommendations.]

Sources for this information:

1. [IRWM plans,
2. water elements of general plans,
3. Regional Water Quality Control Board basin plans and water quality reports.]

Considerations for this subsection:

- [This section will directly support funding recommendations in the Update 2013 finance plan (within Volume 1).
- Priorities will be regionally driven and can vary from specific regionally preferred projects to entire IRWM or other plans.
- Priorities can be expressed by IRWM, county, or another geopolitical subdivision.]

[PLACEHOLDER – Groundwater content to be developed]

- [Summary of groundwater-related resource management strategies and policies in the Hydrologic Region.
- Summary of groundwater data gaps for the Hydrologic Region, how these gaps affect groundwater management and policy, and recommendations to reduce data gaps in the future.
- Selected maps and tables from the main text of the report, as appropriate.
- Discussion on groundwater sustainability and sustainability indicators to monitor progress towards the resource sustainability.]

[PLACEHOLDER –Integrated Flood Planning Content to be developed.]

Finance

[PLACEHOLDER – Finance Content under development]

[PLACEHOLDER –Integrated Flood Planning content to be developed]

DWR has solicited and awarded several rounds of IRWM Planning and Implementation grants with Proposition 84 funding (Table CC-1.)

PLACEHOLDER Table CC-1 Summary of Proposition 84 IRWM Grant Awards to the Central Coast Region

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Water Planning and Governance

This subsection contains a discussion of the following topics.

- [Institutional improvements, expansion of IRWM partnerships (e.g., tribal) and alternatives to IRWM where appropriate.]

Considerations for this subsection:

- [This section will take a critical look at IRWM as it pertains to each region.]

[PLACEHOLDER – Groundwater content to be developed]

- [Summary of groundwater governance associated with the various groundwater management plans (GWMPs), Integrated Regional Water Management (IRWM) Plans, conjunctive management projects and groundwater recharge projects, groundwater monitoring, groundwater ordinances, and adjudicated groundwater basins within the Hydrologic Region.
- Summary table of groundwater-related planning and governance within the Hydrologic Region.
- Summary discussion on Case Studies – successes and challenges.]

[PLACEHOLDER – Integrated Flood Planning Content to be developed]

Central Coast Water Purveyors by IRWM Region

- Santa Cruz (http://sccounty01.co.santa-cruz.ca.us/eh/WR/WR03200.htm)
  - Central Water District
  - City of Santa Cruz Water Department
  - City of Watsonville Department of Public Works and Utilities
  - Pajaro Valley Water Management Agency
  - San Lorenzo Valley Water District
  - Scotts Valley Water District
  - Soquel Creek Water District
  - Private wells and stream diverters
- Pajaro River Watershed (http://www.pajarowatershed.org/Content/10050/water_supply.html)
  - Aromas Water District
  - City of Gilroy
  - City of Hollister
  - City of Morgan Hill
  - City of San Juan Bautista
  - City of Watsonville
  - Pajaro Valley Water Management Agency
  - Pajaro/Sunny Mesa Community Services District
  - San Benito County Water District
  - Santa Clara Valley Water District
  - Sunnyslope County Water District
- Greater Monterey (http://ccwg.mlml.calstate.edu/irwmp/documents)
  - Alco Water Service Company
  - California American Water Company
  - Julia Pfeiffer Burns State Park
  - Andrew Molera State Park
  - Pfeiffer Big Sur State Park
  - Fremont Peak State Park
  - California Utilities
  - California Water Service Company
  - Camp Roberts
  - Castroville Community Services District
  - Chualar Community Services Area
  - City of Gonzales
  - City of Greenfield
  - City of Soledad
  - Fort Hunter Liggett
  - King City
  - Little Bear Water Company
  - Marina Coast Water District
  - Monte Del Lago Park
  - Monterey Regional Water Pollution Control Agency
  - Pajaro Sanitation District operated by Monterey County Public Works
  - Pajaro/Sunny Mesa Community Services District
  - Salinas Valley State Prison

  - San Ardo Water District
  - San Lucas County Water District
  - Soledad Prison/Corrections Training Facility
  - Spreckels Water Company
  - Private wells, as well as stream/spring diverters
- Monterey Peninsula, Carmel Bay, South Monterey Bay (http://www.mpwmd.dst.ca.us/Mbay_IRWM/Mbay_IRWM.htm)
  - California American Water
  - Carmel Area Wastewater District
  - Cities, County and Airport District
  - Marina Coast Water District
  - Monterey Peninsula Water Management District
- San Luis Obispo (http://www.slocountywater.org/site/Frequent%20Downloads/Integrated%20Regional%20Water%20Management%20Plan/July%202007%20Plan%20Update/index.htm 5)
  - Atascadero Mutual Water Company
  - Avila Beach CSD
  - Cal Cities Water
  - California Men's Colony
  - Cambria CSD
  - Camp San Luis Obispo
  - City of Arroyo Grande
  - City of Atascadero
  - City of Grover Beach
  - City of Morro Bay
  - City of Paso Robles
  - City of Pismo Beach
  - City of San Luis Obispo
  - Cuesta Community College
  - Garden Farms County Water District
  - Heritage Ranch CSD
  - Los Osos CSD
  - Nipomo CSD
  - Oceano CSD
  - Port San Luis Harbor District
  - San Luis Obispo County Flood Control and Water Conservation District
  - San Miguel CSD
  - San Simeon CSD
  - Templeton CSD
- Santa Barbara Countywide (http://www.countyofsb.org/irwmp/irwmp.aspx?id=39044)
  - Carpinteria Valley Water District
  - Casmalia Community Services
  - City of Buellton
  - City of Guadalupe
  - City of Lompoc
  - City of Santa Barbara

- City of Santa Maria
- City of Solvang
- Cuyama Community Services District
- Golden State Water Company
- Goleta Water District Service
- La Cumbre Mutual Water Company
- Los Alamos Community Services District
- Mission Hills Community Services District
- Montecito Water District
- Santa Ynez River Water Conservation District Improvement District No. 1
- Vandenberg Air Force Base
- Vandenberg Village Community Services District

Current State of the Region

[Note: Align with region description in IRWM standards.]

Flooding is a significant issue in the Central Coast Hydrologic Region, and exposure to a 500-year flood event threatens one in three residents, more than $40 billion dollars of assets (crops, buildings, and public infrastructure), and over 310 sensitive species. In Monterey County alone, more than 50 percent of the population is exposed to 500-year flood event. In the Central Coast region, local projects totaling $280 million have been proposed, including major projects on Carmel River, Pajaro River, Salinas River, Soap Lake, and Llagas Creek.

Slow-rise flooding is the overwhelmingly predominant type of flooding in the Central Coast Hydrologic Region. Debris flows occur during most major storms, particularly when forest fires of the previous season have damaged vegetation. Tsunamis are infrequent but have been known to cause major devastation in coastal areas such as Santa Cruz. Flash floods and coastal flooding also cause damage at times, and stormwater and structure failures occasionally occur. Flood damage has been observed in the Central Coast Hydrologic Region since at least 1861. For a list of floods in this hydrologic region, refer California Flood Future Report Attachment C: Flood History of California Technical Memorandum.

Setting

- [An overview of water availability, uses, quality, flood management, and ecosystems in the region and unique sub regions.
- IRWM plans, basin plans, land use surveys, Department of Finance population data, conservancy reports, regional studies, climate programs, etc.]

The Central Coast Hydrologic Region extends from southern San Mateo County in the north to Santa Barbara County in the south (Figure CC-1 Central Coast Hydrologic Region). The region includes all of Santa Cruz, Monterey, San Luis Obispo, and Santa Barbara counties, most of San Benito, and parts of San Mateo, Santa Clara, Ventura, and Kern counties. Geographically, the vegetation and topography of the Central Coast is highly variable and includes redwood forests, foggy coastal terraces, chaparral-covered hills, green cultivated valley floors, stands of oak, warm and cool vineyards, and semi-arid grasslands. The climate and microclimates of the region are unique and foster both ecological and agricultural diversity.

PLACEHOLDER Figure CC-1 Central Coast Hydrologic Region

[FIGURE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Among all of California's hydrologic regions, the Central Coast is the most reliant on groundwater for its water supply (Figure CC-2.)

PLACEHOLDER Figure CC-2 Agricultural and Urban Demand Supplied by Groundwater. From DWR Bulletin 118 – California's Groundwater (2003)

[FIGURE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Groundwater supplies are locally supplemented by stream diversions, timed releases from regional reservoirs, and some imported surface water. Factors that affect water availability in the region include precipitation, groundwater recharge capacity, groundwater quality degradation, groundwater pumping management styles or practices, surface water and reservoir storage capacity, as well as the annually variable SWP and CVP water deliveries.

Water Uses

[PLACEHOLDER - Domestic/municipal/agriculture and environmental/riparian/wetlands/ocean content to be developed]

Agricultural Water

San Benito County and Santa Clara County use water purchased from USBR via the San Felipe Project in addition to groundwater supplies and recycled water. The majority of San Felipe water is consumed by irrigation; and the remainder is consumed for domestic, municipal, industrial purposes, and for groundwater recharge. In southern Santa Clara County, San Felipe water is used for agricultural irrigation and groundwater recharge.

The US Department of Agriculture, with the passage of the 2008 Farm Bill, seeks to improve water quality and quantity with the new Agricultural Water Enhancement Program. The Central Coast Resource Conservation and Development Council was awarded a $1.810 million grant in 2009 to improve Central Coast water quality through reduction of agricultural runoff, leaching of nutrients, and water usage.

Urban Water

Most of the region's urban water demands occur in the coastal zones of San Luis Obispo and Santa Barbara counties. These demands are clustered into corridors bounded by (1) San Luis Obispo and Santa Maria and (2) Goleta and Carpinteria. The latter is the most significant and includes the City of Santa Barbara. In the warmer interior of the region, one major corridor exists. This is bounded by the cities of Paso Robles and Templeton. Outside of these centers, urban land use activities and demands decrease significantly. The demands come from small communities, widely scattered residential housing and farmsteads, and a few commercial establishments.

Watersheds

The Central Coast Hydrologic Region is divided here into the Northern and Southern Planning Areas. These Planning Areas are geographic collections of individual and shared watersheds with the Monterey-San Luis Obispo county line serving as the boundary between the two Planning Areas. All rivers within the Central Coast region drain into the Pacific Ocean. Following is a summary of the descriptions of each planning area.

Northern Planning Area Watersheds

The Northern Planning Area contains all of Santa Cruz and Monterey counties, most of San Benito County, the southern part of Santa Clara County, and a small part of southern San Mateo County. The main rivers in the region are the San Lorenzo, Pajaro, Salinas, San Benito, Carmel, San Antonio, and Nacimiento. Coastal watersheds west of the northern Santa Lucia Range include the Little Sur and Big Sur rivers and numerous coastal streams, some of which are perennial.

The San Lorenzo River originates at the crests of the Santa Cruz and Ben Lomond Mountain ranges and enters the Pacific Ocean at Santa Cruz. The Pajaro River begins in southern Santa Clara County and is joined by Pacheco Creek, the San Benito River, and Tres Piños Creek. The Pajaro River watershed spans four counties. The river enters Monterey Bay and the Pacific Ocean west of Watsonville. The Pajaro River watershed is one of the Central Coast regions largest and is well known for its productive agricultural soils and powerful flooding characteristics.

The largest watershed in the region is the Salinas River watershed, which drains more than 40 percent of the Central Coast region. The Salinas River originates in the La Panza Mountains of San Luis Obispo County and flows northward through the Salinas Valley to Monterey Bay, a length of approximately 170 miles. Major tributaries to the Salinas River are the Nacimiento, San Antonio, and Arroyo Seco rivers, all of which originate west of the Salinas River in the Santa Lucia Range. Other tributaries are the Estrella River and San Lorenzo Creek, which begin east of the Salinas River in the Cholame Hills and Gabilan Range, joining the river at King City.

The Carmel River watershed begins on the western slopes of the Sierra de Salinas range. Numerous creeks join the Carmel River, which flows through Carmel Valley and into the Monterey Bay National Marine Sanctuary at Carmel Bay.

Southern Planning Area Watersheds

The Southern Planning Area contains all of San Luis Obispo and Santa Barbara counties, as well as a portion of northwest Ventura and a few square miles of Kern counties. The principal watersheds are the Upper Salinas, the Santa Maria—which includes the Huasana, Cuyama, and Sisquoc rivers—the San Luis Obispo, San Antonio, Santa Ynez, Carrizo Plain, and the Santa Barbara Channel Islands. As in the North Planning Area, coastal watersheds here are mostly short and steep. They range in size from 162 acres to 30,572 acres.

The Upper Salinas River originates in the La Panza Mountains of southern San Luis Obispo County and flows northward, joined by several creeks and the Estrella River before crossing over into the Northern Planning Area. The Santa Maria, San Antonio, and Santa Ynez watersheds drain to the Pacific Ocean through rivers that originate 10 or more miles inland to the east. The San Luis Obispo watershed consists of coastal streams that originate in the hills and mountains southeast of the Santa Lucia Range. The Carrizo Plain, just west of the San Luis Obispo-Kern county line, is a large semi-enclosed alkali ephemeral lake basin traversed by the San Andreas Fault. The Santa Barbara Channel Islands watersheds drain to the Pacific Ocean through streams and minor drainages on each of the islands.

[PLACEHOLDER Integrated Flood Planning content to be developed]

Groundwater Aquifers

[PLACEHOLDER – Groundwater content to be developed]

- [Brief physical description of the significant alluvial and fractured rock (if applicable) aquifer systems within the Hydrologic Region.
- Brief description of the priority groundwater basins within the Hydrologic Region.
- Table showing the groundwater basins and subbasins within the Hydrologic Region, by their priority designations.
- Map showing the groundwater basins and subbasins within the Hydrologic Region, by their priority designations.
- Brief discussion of the well infrastructure, with an explanation of the data gaps associated with this important dataset.
- Brief and general discussion of groundwater occurrence and movement, and identification of key recharge and discharge areas, subject to availability of information.
- Map showing groundwater elevation contours with arrows depicting general direction of groundwater movement, subject to availability of information.]

PLACEHOLDER Figure CC-3 Groundwater Aquifers as Identified in DWR Bulletin 118 – California's Groundwater (2003)

[FIGURE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Ecosystems

Within the Central Coast region, the varied and often unique flora and fauna are supported by ecosystems that reflect the local geology, hydrology, and climate. Distinct ecological sections are represented in the region: the Central California Coast, the Central California Coast Range, and the Southern California Coast, of which only Santa Barbara County is a part. Each of these ecological sections has ecosystems that support diverse, sometimes specialized, assemblages of plants and animals. The Central Coast is home to numerous threatened and endangered wildlife (Box CC-1) (Table CC-2) and plant species (Table CC-3.)

PLACEHOLDER Box CC-1 Explanation of Federal- and State-listed Plant and Wildlife Ranking/Determinations

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-2 Critical Wildlife Species List for the Central Coast

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-3 Critical Plant Species List for the Central Coast

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Watersheds in the Northern Planning Area are variable in habitat, climate, and geology. The Santa Cruz Mountains bioregion supports redwood and Douglas fir forests, Coast live oak, chaparral and manzanita shrub lands, coyote brush, and native California grasses. Unique to the area are plant communities such as sand hills and sand parklands found nowhere else in the world. This biological diversity also characterizes the San Lorenzo River watershed. The northern Santa Cruz County planning region includes the southernmost range for coho salmon, and contains three of the five streams where these fish occur south of San Francisco. Santa Cruz County watersheds also support populations of steelhead trout and the California red-legged frog.

The ecological subsection of Watsonville Plain-Salinas Valley contains the Pajaro and Salinas rivers, and the Elkhorn Slough. The landscape is predominantly alluvial plain, covered with stream-derived, rich soils. Woodlands contain Valley and Coast live oak, and riparian areas have scattered stands of cottonwood and willow. Elkhorn Slough harbors one of the largest tracts of tidal salt marsh in California. This ecological area provides much-needed habitat for hundreds of species of plants and animals, including more than 340 species of birds. More than 7,000 acres of protected lands are in the Elkhorn Slough watershed. Moss Landing Wildlife Area is in Monterey County adjacent to Elkhorn Slough. There are 728 acres of salt ponds and salt marsh just north of Monterey. This is part of the largest unaltered salt marsh along the California coast.

The Pajaro River watershed supports a multitude of biotic habitats and special status plant and animal species, including ____.... **[PLACEHOLDER: Awaiting additional content to be developed].**

The Salinas River watershed's riparian habitat occurs along narrow strands along the banks of the Salinas River but rarely exists as extensive, mature stands. The habitat has been reduced and fragmented by agricultural conversion, urban development, grazing, and flood control activities. Tributaries to the Salinas River provide natural habitat for steelhead trout.

The Santa Lucia Range contains canyons populated by Douglas fir, redwood, oaks and mixed conifers, California sagebrush, chaparral, and manzanita shrubs. The Monterey Peninsula includes a diverse assemblage of plant and animal species, including ____**[PLACEHOLDER: Awaiting additional content to be developed].**

Watersheds in the Southern Planning Area in San Luis Obispo and Santa Barbara counties support a wide variety of landscapes populated by coastal chaparral, Valley, Coast live, and Blue oaks, mixed conifers, willows, sycamores, manzanita, and grasslands. Semiarid mountains, serpentine habitats, grasslands, juniper and oak woodlands provide habitat and migration corridors for a wide variety of native species.

The Carrizo Plain, east of the Cuyama River and the Caliente Range, contains 250,000 acres of native California grasslands—the largest single native grassland remaining in California. The plain's ecosystem supports the largest concentration of endangered animal species in California.

Santa Barbara County is located at a point of transition between the Southern California and Northern California ecozones and is characterized by rare plant assemblages. More than 1,400 plant and animal species are found in the county. Several salt marshes occur in Santa Barbara County and provide habitat for a number of estuarine invertebrates and fish, migratory birds, and rare and endangered animal species.

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Climate

The Central Coast region has a temperate Mediterranean climate characterized by mild, wet winters and warm, dry summers. West of the Coast Range, the climate of the region is dominated by the Pacific Ocean, characterized by small daily and seasonal temperature changes, and high relative humidity. As distance from the ocean increases, the maritime influence decreases, resulting in a more continental type of climate that generates warmer summers, colder winters, greater daily and seasonal temperature ranges, and lower relative humidity. For example, on a summer day, the maritime influence on climate can be felt by traveling from Cambria to Shandon.

Naturally occurring microclimates are prevalent throughout the region, where the local topography and geography creates pockets of climate that are distinct from the surrounding area. Microclimates are beneficial, if not crucial, to the region's agriculture and viticulture, providing both warm and cool environments for a broad spectrum of specialty crops such as wine grapes, fruits, nuts, and vegetables. The vineyard-growing areas throughout the region generally have summers that are long and cool due to the influence of the ocean. High-quality wine grapes thrive in this environment with moderate climate all summer, foggy mornings, bright sunshine through the afternoon, and very windy afternoons and early evenings.

Between 2005 and 2008, the average annual precipitation—usually rain—in the region ranged from about 12 to 42 inches.

Most of the rain occurs between late November and mid-April. The average annual precipitation near Salinas is about 14 inches with Santa Cruz and Big Sur receiving almost double that amount. Average annual precipitation in most of the Santa Cruz Mountains can exceed 50 inches. The southern interior basins usually receive 5 to 10 inches per year; the mountain areas receive more rainfall than the valley floors.

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Demographics

- [Describe the demographics for the region from the last census data available.
- Describe the locations and extents of disadvantaged communities in the region.]

In 2012, the Central Coast Hydrologic Region had an estimated 1.53 million people (Table CC-4). The population of the Central Coast is projected to increase by about 20% by 2050 (Table CC-5).

PLACEHOLDER Table CC-4 Population Estimates for the Central Coast from 2000 to 2010.

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-5 Population Estimates and Decadal Projections for the Central Coast

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Like the rest of California, many small agricultural communities in the Central Coast are considered Disadvantaged Communities (DAC) (Table CC-6). These are communities where the Median Household Income (MHI) is less than 80% of the Statewide MHI, which for 2006-2010 is $60,883. Therefore, a DAC MHI is less than $48,706.

PLACEHOLDER Table CC-6 Disadvantaged Communities within the Central Coast

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Land Use Patterns

The varied topography of the Central Coast region and its distance from California's major population centers results in a landscape that is primarily pastoral and agricultural. Major economic activities include tourism, agriculture and agriculture-related processing, universities and education, government and service-sector employment.

Federal lands in the region total more than 2 million acres and include Los Padres National Forest, Pinnacles National Monument, Channel Islands National Park, Carrizo Plain National Monument, Monterey Bay National Marine Sanctuary, Guadalupe-Nipomo Dunes National Wildlife Refuge, and the Salinas River National Wildlife Refuge. Military installations include Vandenberg Air Force Base, Fort Liggett, Camp Roberts, Camp San Luis Obispo, and Presidio of Monterey. State facilities include

California Polytechnic State University and California State University Monterey, and nearly 60 parks, beaches, and monuments. The region's economy benefits greatly from its parks, beaches, and forests, which draw millions of visitors each year.

Agriculture is the backbone of the Central Coast, contributing more than $ XX in 2011 **[PLACEHOLDER: Integrated Flood Planning content to be developed]** in gross agricultural production value to the regional economy. The climate, microclimates, and rich soils allow for specialty food and nursery crops as well as range pasture and dry-farmed grain. Between 2005 and 2009, the average acreage of all crops was about 661,000 acres, and the average acreage of irrigated crops was approximately 447,000 acres (DWR, Land and Water Use estimates.) Top crops for the Central Coast region include strawberries, lettuce, and wine grapes, yet each county in the region produces a wide variety of produce and products.

PLACEHOLDER Figure CC-4 Central Coast Strawberry Production

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC-5 Central Coast Total Vegetables and Row Crops

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC-6 Central Coast Total Fruit and Nuts

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC-7 Central Coast Total Nursery

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC- 8 Central Coast Total Livestock

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC-9 Central Coast Acres of Wine Grapes over Time

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

The rate of urban change-- or the conversion of farm and grazing land to urban or nonagricultural use-- in the region, from 2006 to 2010 varied from county to county, but as with the rest of California, the conversion trend steadily continues.

PLACEHOLDER Table CC-7 Ag Land Conversion Table from 2006 to 2010

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Northern Planning Area

Northern Santa Cruz County is dominated by residential land use, including rural and mountain residential zoning, timber production, open space, agriculture, and a mix of commercial and special districts. The lower portions of the watersheds, close to Monterey Bay, are more urbanized with residential, commercial, and light industrial land use. Upper watershed land use consists predominantly of rural residential, timber production, open space, some mining, and limited agriculture. On the northern coastline, the coastal terraces are used for agriculture and grazing. Santa Cruz County is economically dependent upon tourism, recreation, and the UC Santa Cruz campus. Agriculture is the county's second largest industry, with a gross production value of $566 million in 2011.

Southern Santa Cruz County, including Watsonville Sloughs, is a productive agricultural district yielding strawberries, raspberries, landscape plants, flowers, and vegetables. Coastal agriculture includes brussel sprouts, strawberries, lettuce, and other specialty crops.

Monterey County has the highest density areas of urban development, clustered in the vicinity of Monterey Bay. Along the Salinas River are several urban and residential centers, including the City of Salinas. The gross agricultural production value of Monterey County in 2011 was $3.85 billion. The predominant land use in the Salinas Valley is agriculture and rangeland, with discrete areas of urban development in the cities and towns along the Salinas River. Near Seaside, more than 1,300 acres of the former military installation Fort Ord have been redeveloped into California State University, Monterey Bay.

The Monterey Peninsula and its surrounding areas are composed of a wide range of land uses that serve residential, commercial, industrial, recreational, and open space uses. Urban development is concentrated primarily in the coastal cities. Outside of the cities, low- to rural-density residential areas dominate. Land use in the 255-square mile Carmel River watershed includes wilderness, viticulture, grazing, recreation (golf courses and park areas), and sparse residential, suburban, commercial, and light industrial. Very little of the watershed is in traditional agricultural use. Resource conservation represents another important land use throughout the region, with parts of the planning area including the Ventana Wilderness and Los Padres National Forest.

Santa Clara and San Benito county land use includes agricultural, rural residential, and urban. In San Benito County, the gross agricultural production value of 2011 was $263 million, and for 2010, the gross agricultural production value of Santa Clara County was $266 million.

As of 2011, the Northern Planning Area currently devotes more than 47,300 acres to growing wine grapes.

Southern Planning Area

The southern Central Coast is primarily pastoral and agricultural with scattered population clusters developed on coastal terraces and interior lowlands and valleys. Agriculture in the region has grown significantly in the last several years, thanks largely to vineyard expansions. As of 2012, about 58,000 active vineyard acres support about 280 wineries in the Southern Planning Area.

Agriculture comprises two-thirds of the land use in San Luis Obispo County with the majority of this acreage used for livestock grazing. The gross value of agricultural production in 2011 was $736 million Active vineyards cover about 36,000 acres. Other land uses include rural lands, open space, and residential, commercial, and urban uses.

Major land use in Santa Barbara County includes agricultural preserves (land zoned for 100-acre or greater lot size) or other agriculturally zoned land. Less than 3 percent of the county is within incorporated cities, and 2 percent is within unincorporated urban areas. The value of agricultural production in 2011 was $1.2 billion.

As of 2008, the county has more than 21,000 active vineyard acres, generating more than $100 million annually in wine grapes. Oil production continues offshore, but onshore production continues to decline.

Land Use Map by Hydrologic Region

[11 Cropping Category:]

Tribal Communities

Demographics

Tribes with historic or cultural ties to the Central Coast region are primarily the different bands of the Chumash, Esselen, Ohlone, and Coastanoan (previously referred to collectively as the Mission Indians): Amah Mutsun Tribal Band, Amah Mutsun Band of Ohlone/Coastanoan, Coastal Band of Chumash, Coastanoan Ohlone Rumsen-Mutsen, Indian Canyon Mutsun Band of Costanoan, Northern Chumash Tribal Council, Ohlone/Coastanoan-Esselen Nation, Ohlone Tribe, and the Salinan Tribe (of Monterey, San Luis Obispo, and San Benito Counties).

Currently, Tribal landholdings in this region include the Indian Canyon community and the Santa Ynez Reservation, owned by the Santa Ynez Band of Chumash Indians and composed of less than 140 acres in Santa Barbara County. A resort casino was added to the reservation in 2004 and has since become a major source of tourism to the Santa Ynez Valley area.

Collaborative Efforts

The Santa Ynez Chumash Tribe is working with several federal, State, and local agencies and non-profit organizations to ensure the success of their Environmental Office programs. These agencies include the United States Environmental Protection Agency, the US Bureau of Reclamation, the Community Environmental Council and the Cachuma Operations and Maintenance Board.

Concerns and Priorities

Establishing/restoring federal recognition of Central Coast Tribes.

Accomplishments

The Santa Ynez Environmental Office is conducting riparian habitat assessments, biological assessments, surface and ground water quality monitoring, identifying potential pollution sources, identifying and removing invasive plant species, and developing a Water Quality Control Plan, a Fish, Wildlife, and Habitat Management Plan, and an Integrated Weed Management Plan. They are working with the Chumash Cultural Department to host a workshop at the annual Camp Kalawa Shaq that shares the importance of natural resource protection with children.

Regional Resource Management Conditions

Water in the Environment

Environmental water in the region consists primarily of minimum instream requirements for the Carmel River and the Nacimiento River. As of 2005, the Carmel River below the San Clemente Dam and Reservoir has an annual minimum instream flow of 3,620 acre-feet. Annual instream flow requirements for the Nacimiento River below the Nacimiento Dam are 18,099 acre-feet.

In San Luis Obispo County, a Habitat Conservation Plan has been developed for the upper watershed of the Arroyo Grande Creek. Once implemented, the plan calls for modified stream releases from Lopez Reservoir into the creek, with the intention of partially restoring and enhancing the habitat of steelhead trout and red-legged frogs.

Segments of the Big Sur River and the Sisquoc River have been designated as part of the national Wild and Scenic River system. For the Big Sur River, the North Fork and South Fork segments have unimpaired runoff from their headwaters to their confluence at the boundary of the Ventana Wilderness in Los Padres National Forest in Monterey County. In 2005, the runoff for that reach was more than 121,000 acre-feet. In Santa Barbara County, the Sisquoc River segment (mostly within the San Rafael Wilderness) has unimpaired runoff along a 33-mile stretch. The runoff in 2005 was more than 47,000 acre-feet.

Recent collaborative efforts organized by the Central Coast Wetlands Group (at Moss Landing Marine Labs) have initiated the development of a much-needed and comprehensive mapping and database program. Over time, this program may provide the data needed to better quantify the wetland and riparian water requirements in the Central Coast region.

The Central Coast Resource Conservation & Development Council continues to develop and participate in collaborative environmental water projects aimed at waterway and habitat restoration. Recent projects include Toro Creek, Pajaro River Watershed, and Sanborn Creek.

The Monterey County Water Resources Agency releases water from the San Antonio and Nacimiento reservoirs in routine, seasonal conservation releases to maintain flows on the Salinas River and recharge the river basin. Spillway modification construction has begun and upon completion will allow greater release of water from the dam during heavy-rain times and more flow on the Salinas River during dry times.

The San Lorenzo River Watershed Management Plan, adopted in 1979, established minimum stream flow requirements for salmonid migration, spawning, and rearing. The water rights for most surface water diversions include requirements for minimum bypass flows, including a year-round release (1 cubic foot per second) to Newell Creek from Loch Lomond reservoir. The City of Santa Cruz Water Department is working with the California Department of Fish and Game and the National Marine Fisheries Service to develop a habitat conservation plan to minimize any adverse impacts of aquatic habitat from operation of its water supply facilities.

In general, priority water-related ecosystem improvements for the State of California are identified by DFG as projects that achieve one or more of the following:

- Recovery for endangered and other at-risk species and native biotic communities, including rare natural communities;
- Restore natural processes, including fluvial geomorphology and natural vegetation recruitment;
- Restore natural hydrologic processes, including magnitude, duration and timing of flows;
- Maintain or enhance populations of selected species for sustainable commercial or recreational harvest;
- Protect or restore functional habitat types including, but not limited to, floodplain, riparian, and wetland;
- Prevent or reduce negative impacts from both aquatic and terrestrial non-native species including those associated with water supply and conveyance projects such as quagga and zebra mussels; and
- Improve instream flow as well as water and sediment quality conditions, including temperature, to support healthy ecosystems.

Each of these statewide priorities is interrelated, and often accomplishments towards one improvement will also provide benefits to others. These priorities are not ranked, and are in no particular order; however, projects that incorporate one or more of the above criteria would be viewed by DFG as valuable ecosystem improvements.

It is important to note that in recent years, many watersheds in California have completed watershed assessments, management strategies and plans, as well as conservation strategies and plans. All of these documents identify resources within their respective project boundaries and needs for restoration, often including the potential for improving water resources via restoration or other actions. These plans should be cumulatively assessed and synthesized in relation to the California Water Plan in order to produce a document that (1) outlines common elements that address water resource issues; (2) identifies opportunities for restoration actions that will improve water resources; and (3) addresses the needs of species and/or habitats that transcend watershed boundaries.

DFG has identified the following water-related needs for the Central Coast Hydrologic Region:

- Restoration projects that facilitate the improvement of aquatic habitat, including deep and shallow open water;
- Acquisition of conservation easements on lands;
- Protect or restore fish habitat through the improvement of fish passage conditions, gravel augmentation, hydrology, fish screens, min/max flow, etc…;
- Restoration of floodplain process, including hydrodynamic process, to benefit listed species;

- Development, collection and publication of instream flow data, including recommended instream flow levels and minimum instream flow requirements;
- Prevent or reduce negative impacts from invasive non-native species including those associated with water supply and conveyance projects such as quagga and zebra mussels, egeria densa, water hyacinth, and others;
- Improvements in the coordination, management and implementation of groundwater management;
- Development, collection and publication of instream flow data, including recommended instream flow levels and minimum instream flow requirements;
- Prevent or reduce negative impacts from invasive non-native species including those associated with water supply and conveyance projects such as quagga and zebra mussels, egeria densa, water hyacinth, and others;
- Restoration or modification to allow for a more natural regime of hydrology and hydraulics;
- Restoration projects that facilitate the increase of populations and improvement of habitat for salmon, especially Coho;
- Restoration of riparian habitat, including conservation of riparian corridors;
- Restoration of upland plant communities;
- Water quality improvements (sediment, oxygen saturation, pollution, temperature, etc…) to support healthy ecosystems;
- Improvements in coordination, management and implementation of watersheds;
- And, restoration projects that will improve upon existing wetlands, or create new wetlands in appropriate areas;

[PLACHOLDER – Groundwater content to be developed]

- [Description of the groundwater related environmental issues for the Hydrologic Region based on connection, disconnection, or seasonal connection between the aquifer groundwater table and the local surface water systems (including wetlands), subject to availability of data.
- Description of the importance of protecting groundwater recharge areas, and potential environmental consequences associated with contaminated aquifers.]

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Water Governance

[PLACEHOLDER – Groundwater content to be developed]

- [Discussions of the various governance approaches to groundwater management within the Hydrologic Region and identification of specific GWMPs, IRWM Plans, groundwater ordinances, and adjudicated groundwater basins within the Hydrologic Region.
- Table listing the GWMPs, IRWMPs, groundwater ordinances, and adjudicated groundwater basins.
- Maps showing area coverage for GWMPs and IRWMPs, and “dot” locations of groundwater ordinances and adjudicated basins.]

Urban Water Suppliers that Submitted Urban Water Management Plans to DWR in 2011

- California Water Service Company - King City
- California Water Service Company - Salinas District
- Carpinteria Valley Water District
- Central Coast Water Authority
- City of Gilroy
- City of Hollister
- City of Lompoc
- City of Morro Bay
- City of Paso Robles
- City of Pismo Beach
- City of San Luis Obispo
- City of Santa Barbara
- City of Santa Maria
- City of Watsonville
- Golden State Water Company - Orcutt
- Marina Coast Water District
- Nipomo Community Services District
- San Benito County Water District
- San Luis Obispo County Flood Control & Water Conservation District Zone 3
- Scotts Valley Water District
- Soquel Creek Water District
- Soquel Creek Water District
- Sunnyslope County Water District

Water Supplies

In California, both water supply and land-use planning are local responsibilities of utilities and city and county governments. Given its limited access to imported water, the Central Coast region has long-standing concerns over water supply issues. Water supply sources and conditions differ considerably across the rural counties.

[PLACEHOLDER – Groundwater content to be developed]

- [Description of the major agricultural and municipal areas served and trends in the water use met by groundwater supply, such as more or less reliance on groundwater supply over time.
- Map illustrating the location of major water use met by groundwater supply.
- Table illustrating the trends in water use met by groundwater supply.
- Description of seasonal and long-term groundwater level trends, an overview of groundwater supply sustainability based on existing management considerations, and groundwater change in storage, subject to availability of information.
- Charts of selected well hydrographs illustrating the variability, challenges, and successes in groundwater management in the Hydrologic Region.]

Northern Planning Area

For the Santa Cruz area, streams provide supply for agricultural users, the town of Davenport and the City of Santa Cruz. Groundwater in the area also supplies individual wells and small water companies for rural

residents in Bonny Doon and other areas of the basin. Surface water from the San Lorenzo River watershed contributes to the supply for the City of Santa Cruz and for the communities of the San Lorenzo Valley. Groundwater from the Santa Margarita Groundwater Basin provides the water supply for the Scotts Valley Water District and to the San Lorenzo Valley Water District. All of the water supply for the coastal urban areas of Soquel and Aptos in this subbasin is provided by groundwater. Water supply reliability for both agriculture and municipal use is a concern in the Watsonville area. Due to seawater intrusion, some coastal wells have become too brackish for domestic or agricultural use. Groundwater is the primary source of agricultural water supply at this time for the area, recently supplemented by recycled water and surface water that has been captured and recharged to the groundwater basin.

PLACEHOLDER Table CC-8 City of Santa Cruz Water Dept. - 2009

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

For part of coastal Monterey, nearly all of the water supply comes from the Carmel River and groundwater in the Carmel Valley aquifer, which underlies the alluvial portion of the Carmel River downstream of the San Clemente Dam, and groundwater in the coastal subareas of the Seaside Groundwater Basins. About 70 to 80 percent of the surface runoff in the Carmel River watershed is generated from rainfall within the Los Padres National Forest and Ventana Wilderness.

Hydrological investigations have shown that the Seaside Groundwater Basin can sustainably yield about 3,000 acre-feet of water annually, before being degraded by seawater intrusion. However, between 1995 and 2006, California American (Cal-Am) Water Company, the major water supplier in the Monterey area, pumped on average 4,000 acre-feet per year from the coastal area of the Seaside Basin and 700 acre-feet per year from the Laguna Seca area. Adjudication of the basin in 2006 called for reductions in pumping from the Seaside Basin, likely at a rate of 10% reduction (520 AF) every three years until year 2021. In 2009, the State Water Resources Control Board, Division of Water Rights issued a Cease and Desist Order to Cal-Am, , to reduce its water diversion from the Carmel River by 70% by 2017. Due to these significant water supply reductions, a significant portion of Cal-Am's water supply for the Monterey Peninsula must be replaced with water from new sources (Monterey Peninsula Water Management District, 2011). For the interior part of the region, groundwater supplies are dependent upon recharge by the Salinas River and its tributaries, as well as the Pajaro River.

Portions of San Benito and Santa Clara Counties in the region rely on imported water from the Central Valley Project from the San Luis Reservoir, groundwater, recycled water, and local surface water. Reliability of the CVP supply is a concern. Both Santa Clara Valley Water District and San Benito County Water District have conjunctive use programs. Uvas and Hernandez reservoirs are important for conjunctive use operations in Santa Clara and San Benito counties, respectively.

Other watersheds in the area (about 92 square miles) do not currently provide municipal water from surface runoff; however, these watersheds do provide groundwater recharge to basins that are relied upon for municipal supply.

For improved water supplies in Monterey area, two projects are under consideration: the Coastal Water Project, developed by the privately owned California American Water Company, and an alternatively developed Regional Water Project. Both propose addressing water supply and water quality needs through desalination and aquifer storage and recovery.

Southern Planning Area

Water supplies for the area include groundwater, surface water, imported State Water Project water via the Coastal Branch Aqueduct, and recycled water. The State Water Project can deliver up to 70,500 acre-feet per year into San Luis Obispo and Santa Barbara counties. Water supplies also are enhanced by conjunctive use of surface and groundwater supplies, as well as cloud seeding.

Groundwater is an important source of water supply to the region; 28 groundwater basins underlie the southern part the Central Coast region. Groundwater beneath large extensive alluvial valleys—such as the Salinas, Paso Robles, and Santa Maria valleys—occurs in thick and sometimes confined aquifers. In contrast, groundwater underlying smaller valleys—such as Huasna Valley inland and the San Simeon, Cayucos, and Morro valleys along the coast—occurs in thinner, unconfined aquifers. The principal watersheds in the area are the Salinas River, Estrella River, Carrizo Plain, Estero Bay, Santa Maria River, Santa Ynez River, San Antonio Creek, and the South Coast of Santa Barbara County.

USBR projects in the area include the Santa Maria Project and the Cachuma Project. The Santa Maria Project constructed Twitchell Dam and Reservoir in by 1958 for water conservation and flood control. Twitchell Reservoir stores floodwaters of the Cuyama River, which are released as needed to recharge the groundwater basins in the Santa Maria Valley; this prevents salt water intrusion and also provides full and supplemental irrigation water to approximately 35,000 acres of cropland. The objective of the project is to release regulated water from storage as quickly as it can be percolated into the Santa Maria Valley ground-water basin.

The Cachuma Project, constructed by 1956, consists of dams, reservoirs, tunnels and conveyances. Bradbury Dam stores floodwaters of the Santa Ynez River which are eventually routed to croplands and municipal users of Goleta, Montecito, Summerland, Carpinteria, and the city of Santa Barbara.

Whale Rock Reservoir, owned by the Whale Rock Commission, and the USACE's Santa Margarita Lake both provide water to the city of San Luis Obispo and surrounding communities.

Lake Nacimiento, a reservoir built by the Monterey County Water Authority in San Luis Obispo County, was completed in 1961 and has provided water supplies for agriculture in Monterey County, mitigation of salt water intrusion in the lower Salinas Valley, and urban demands in San Luis Obispo County. San Luis Obispo County, since 1959, has an annual entitlement of 17,500 AF of water from Lake Nacimiento.

Conjunctive use of surface water and groundwater is a long-standing practice in the region. San Luis Obispo County obtains nearly 80 percent of its water from groundwater supplies and about 20 percent from reservoirs and other sources.

The Santa Ynez River Basin is the largest drainage system that is wholly located in Santa Barbara County, draining about 40 percent of the mainland part of the county. It is the primary source of water for about two-thirds of Santa Barbara County residents. Three dams have been constructed on the river to store and divert water to the south county (Cachuma, Gibraltar, and Jameson).

Surface water supplies are an important part of the regional water supply. Lake Cachuma on the Santa Ynez River and Gibraltar Reservoir provide the majority of the south coast's water supply annually. Twitchell Reservoir on the Cuyama River is important to both the water supply and the flood protection of the Santa Maria Valley; the reservoir supplies recharge to the Santa Maria Groundwater Basin.

PLACEHOLDER Table CC-9 Central Coast Stream Diversions for Water Supply

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

[PLACEHOLDER Content update from Mike and Chris]

Water Uses

[PLACEHOLDER: Groundwater content to be developed]

- [Description of the annual groundwater use/demand by beneficial use (agricultural, municipal, and managed wetlands), and by aquifer type (alluvial versus fractured rock, if applicable),
- Discussion of groundwater use as it relates to basin priority.
- Map showing groundwater use as a percentage of the overall supply for alluvial and fractured rock aquifer (if applicable) areas, with overlay of basin prioritization.]

PLACEHOLDER Table CC-10 Demands (Agricultural, Urban, Managed Wetlands, and Environmental)

[TABLE TO COME]

[We want to keep Wetlands separate from Environmental Waters. Environmental waters for "Net" should be zero.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-11 Population Growth by Planning Areas

[TABLE TO COME]

]This will give us a better understanding where the growth is occurring and do we have enough land and water to support future growth. Planning Area is important, because location and Micro Climate plays an important role for future demand requirement and needs.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-12 Urban Per-Capita by Planning Areas

[TABLE TO COME]

[Or do we show long term Per-Capita? The Region Offices have been developing Per-Capita for two decades or longer (Instead of WYs 2006-10).]

[By plotting out per-capita by Planning Area, you can observe the growth and needs for each PA. Looking at PA is important, especially due to climate conditions – Inland vs. Coastal. If we are serious about monitoring and documenting any reduction in per-capita, this would be a good start of tracking any changes. This also gives us an opportunity to work with User's Groups individually (*Local and Regional Planning*) and represents the rural areas, which was a big concern at the Advisory and Regional Committee's Meetings.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-13 Urban Applied Water by Sector

[TABLE TO COME]

[OWUE collects volumes by sectors for User's Group and Self-Producing. This should be easy to create and would help us better coordinate/understand water purveyors locally and regionally (IRWMP) and help us represent and improve our relationship with rural areas. There is a lot of information available for rural areas – Tribal Interests, Environmental Justice, and Small Communities.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-14 Urban Demands by Planning Areas

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-15 Agricultural Acreage by Planning Areas

[TABLE TO COME]

[This will give us a better understanding where the growth is occurring and do we have enough land and water to support future growth. Planning Area is important, because location and Micro Climate plays an important role for future demand requirement and needs.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-16 Agricultural (ETAW by Crop) By Planning Areas

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-17 Agricultural (ETAW by Crop) By Irrigated Crop

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-18 Agricultural Demands by Planning Areas

[TABLE TO COME]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-19 Agricultural Acreage, Evapotranspiration of Applied Water, and Applied Water for Major Crops by Planning Areas

[TABLE TO COME]

[This would give better understanding of the growth and the changes occurring. This also documents the acreage changes and the reduction or increase of applied water. Changes are occurring annually and it would be nice to show the crop shift and the demands changes for the region.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-20 Environmental Instream Water Needs By Planning Areas

[TABLE TO COME]

[We need to keep managed wetlands separate from Instream flow requirement in order to not confuse the people of California and ourselves. By keeping them separate, managed wetlands fall into IRWMP and we can improve our data sets by coordinating with the managed wetlands. It also makes it easier for us to explain why AW is large for the instream requirements, while Net is zero. This is a requirement for a stretch of tributary system, but is not consumptively used (*some riparian ET and depletion into groundwater basin's*).]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-21 Managed Wetlands Water Needs by Refuge/Wildlife Area

[TABLE TO COME]

[This will give us a better understanding where the growth is occurring and do we have enough land and water to support future growth. By showing each managed wetlands separate, this would help us to better coordinate and understand the individual managed wetlands, so local and regional planning (IRWMP) could improve.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Table CC-22 Demands and Prime Supply (Demands by Sector vs. Surface Water/Groundwater)

[TABLE TO COME]

[This will give us a better understanding on the changes with land use and the population growth that is occurring. This will also tell us that demands are normally higher than prime supply- Reuse/Recycled. This would identify that in most case, demands are higher than prime supplies and without reuse (efficiency); most sectors would be short of water. This also provides us with an outlook of basin efficiency that is occurring today with agricultural and managed wetlands. By showing each sector demand with its prime supply, this would help us to better understand future needs and supplies, so local and regional planning (IRWMP) can improve drinking water.]

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

There are about 1.53 million people in the Central Coast region and groundwater accounts for approximately 83 percent of the water supply used for agricultural, industrial, and municipal (urban) purposes (DWR, 2003) and nearly 100 percent for rural domestic purposes. In the Salinas Valley, groundwater accounts for nearly 100% of the potable supply.

In the Central Coast region there are an estimated 400 community drinking water systems and over 80% are small (serving less than 3,300 people) and most serve less than 500 people. Small water systems face unique financial and operational challenges in providing safe drinking water. Given their small customer base, many small water systems cannot develop or access the technical, managerial and financial resources needed to comply with new and existing regulations. These water systems may be geographically isolated, and their staff often lack the time or expertise to make needed infrastructure repairs, install or operate treatments, or develop comprehensive source water protection plans, financial plans or asset management plans (EPA 2012).

In contrast, less than 20% of the region's 400 community drinking water systems are medium and large water systems, and deliver drinking water to over 90% of the region's population (see Table CC-4). These larger water systems have the financial resources to hire staff to oversee daily operations, maintenance needs, and to plan for future infrastructure replacement and capital improvements. This helps to ensure that existing and future drinking water standards can be met.

[PLACEHOLDER Content update from Mike and Chris]

Project Operations

Levee and Channel System

The flood management reservoirs of the Central Coast Hydrologic Region are two major multipurpose reservoirs with flood management reservations, San Antonio Reservoir on the San Antonio River, and Twitchell Reservoir on the Cuyama River, and a small flood storage amount in Nacimiento Reservoir on Nacimiento Creek.

Water Quality Conditions

Water quality for the Central Coast is problematic for both groundwater and surface water supplies, and improving both is an over-arching goal for the hydrologic region.

Regional Water Quality Conditions

The Central Coast is a region of unique habitat areas, significant biodiversity, and many sensitive natural habitats and species of concern. Several areas of the California Central Coast region are severely degraded by high levels of nitrates in surface and groundwater, toxicity to test organisms, pesticides in surface water and sediment that exceed toxic thresholds, and other water quality concerns. Benthic invertebrate communities in these areas, and their associated habitat, are also degraded. These areas are generally dominated by very intensive agricultural activities, some of which result in the addition of nutrients to surface and groundwater. The term nutrient refers to the primary plant nutrients- nitrogen, phosphorus and potassium. Generally, potassium stays bound to soil and is not a water quality problem, but nitrogen in the form of ammonia and nitrate is highly mobile and soluble. Phosphorus is also mobile. The most common nutrients added to the waters of the Central Coast are nitrate and orthophosphate, and the main sources of nutrients are agricultural fertilizers, livestock operations including dairies, and wastewater from sewage treatment plants. Failing and broken septic systems also contribute nutrients to groundwater; locally, this has been a long-standing problem for the city of Los Osos in San Luis Obispo County.

Drinking Water Quality

In general drinking water systems in the region deliver water to their customers that meet federal and state drinking water standards. Recently the Water Boards completed a draft assessment of community water systems that rely on contaminated groundwater. This draft report identified 68 community drinking water systems in the region that rely on at least one contaminated groundwater well as a source of supply. Nitrate and naturally-occurring arsenic are the most prevalent groundwater contaminants affecting community drinking water wells in the region. The majority of the affected systems are small water systems which often cannot provide the economies of scale necessary to construct, operate, and maintain a water treatment facility.

In the Salinas Valley, groundwater accounts for nearly 100% of the potable supply. A 2012 UC Davis study found the largest percentage of nitrate exceedances are in the northern, eastern, and central Salinas Valley, and approximately one-third of the domestic and irrigation wells tested exceed the nitrate drinking water standard of 45 ppm (10 mg/liter as nitrogen) (Harter et al., 2012.). Smaller water systems and domestic wells are typically reliant on shallow groundwater wells and are often located in rural

agricultural areas where nitrate pollution is the most significant. Consequently, residents of the Salinas Valley may be impacted by nitrate contamination exposing local residents to unsafe nitrate-contaminated groundwater now or in the future.

Surface Water Quality

In 1998, the Central Coast Water Board established a regional monitoring program, the Central Coast Ambient Monitoring Program (CCAMP) to assess the health and beneficial use support of the region's surface waters on a regular basis. In addition, since 2004, the Cooperative Monitoring Program for Agriculture (CMP), developed under the Conditional Waiver for Irrigated Lands (Ag Order), has been monitoring 50 long-term trend monitoring sites in agricultural areas.

The Water Board uses CCAMP, CMP and other data to assess the health of the region's surface waters and identify waters (streams, lakes, bays and estuaries) in the region that do not meet water quality objectives and are not supporting their designated beneficial uses, as outlined in the Central Coast Region's Water Quality Control Plan (Basin Plan). Those waters are placed on the Clean Water Act Section 303(d) list of impaired water bodies and the Water Board develops Total Maximum Daily Loads (TMDLs) to restore their beneficial uses.

PLACEHOLDER Figure CC-10 Central Coast Hydrologic Units and Monitoring Sites

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Water Board staff has developed a multi-metric approach to assess general surface water quality conditions that combines and scores multiple parameters into a *water quality index* (Worcester, 2011.) Parameters for this water quality index include water temperature, unionized ammonia, water column chlorophyll a, total dissolved solids (TDS), nitrate-nitrite (as N), orthophosphate, turbidity, and dissolved oxygen. Each parameter is scored into one of five categories: good condition (green), slightly impacted (yellow), impacted (red), and very impacted (dark red). Unscored areas are white, and most occur in the upper watershed areas (Figure 11) Water quality evaluations were performed at 250 sites, revealing that the most severely impacted areas of the Central Coast are 1) the lower Salinas watershed and tributaries, Tembladero Slough-Salinas Reclamation Canal watershed and Moro Cojo Slough (hereafter referred to as the "lower Salinas area") and 2) the lower Santa Maria watershed and tributaries, and lower Oso Flaco Creek (hereinafter referred to as the "lower Santa Maria area"). These are both areas of intensive agricultural activity.

Surface water quality is also evaluated using a *toxicity index.* Toxicity testing exposes test organisms to water or sediment from a stream or other water body, and measures effects on survival, growth and reproduction (lethal and sub lethal effects). The surface water quality toxicity index for the Central Coast region also shows severe impacts in the lower Salinas and Santa Maria areas (Figure CC-12.) Other impacted areas include the lower Santa Ynez River and the San Juan Creek and Watsonville Slough areas of the Pajaro River watershed.

PLACEHOLDER Figure CC-11 Central Coast Surface Water Quality Index using Multiple Parameters

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

PLACEHOLDER Figure CC-12 Central Coast Surface Water Quality Toxicity Index

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Two of the region's most impaired water bodies drain directly to sensitive estuarine habitat. In the north, flows from the Salinas Reclamation Canal move into the Old Salinas River and- during an incoming tide- flow into the Elkhorn Slough, a State Marine Protected Area and a National Estuarine Research Reserve. In the south, Orcutt Creek provides the primary flow into the Santa Maria estuary, which provides critical habitat for endangered snowy plovers, threatened steelhead trout, and other sensitive species.

Parameters of Special Concern

For the Central Coast region, surface water quality parameters of special concern include nitrate, water toxicity, pesticides, fecal coliform, sediment, temperature, and dissolved oxygen. Surface waters that exceed the TMDLs for these parameters are placed on a Clean Water Act Section 303(d) list of impaired water bodies.

Surface Water Quality Parameters of Special Concern

- Nitrate
  - Nitrate is a severe and widespread pollutant for the Central Coast region. Nitrate enters the waters of the region most commonly as runoff from agricultural fields or through percolation to groundwater.
  - The 2010 List of Impaired Waterbodies (State Water Resources Board, 2010) includes 47 Central Coast water bodies that have drinking water beneficial uses impaired by nitrate pollution. The three major agricultural areas of the Central Coast contain 68% of these nitrate listings: the Lower Salinas (15 water bodies), the Pajaro River (5 water bodies), and the lower Santa Maria (12 water bodies).
- Fecal Coliform
  - Fecal coliform is an indicator for pathogenic bacteria, and enters the waters of the region through storm water runoff (which picks up bacteria from pet, animal, and human waste), the presence of cattle and other animals in creeks, and through surfacing water from failing septic systems.
  - Measurements of fecal coliform in many Central Coast water bodies exceed Basin Plan criteria, impairing water contact recreation and shellfish harvesting.
- Toxicity and Pesticides
  - Toxicity is a measure of the detrimental effects of pollutants on aquatic organisms, and can be caused by metals, fertilizers, pesticides, petroleum products and other organic compounds.
  - Region-wide, CCAMP and the CMP have conducted toxicity monitoring in 80 streams and rivers at sample sites near the most agriculturally intensive land use. No toxic effects were

observed in 16% of the sample sites, and some measure of lethal effect was observed at 65% of the sample sites. Results of this monitoring indicate that 90% of all severely toxic sample sites measured on the Central Coast occur in the agricultural areas of the Lower Salinas, Pajaro River, and the lower Santa Maria. Within these areas, 29 water bodies are listed as impaired by toxicity.

- Sediment, Temperature, and Dissolved Oxygen
  - Regionally, erosion and excessive sedimentation in rivers and streams have led to a decline in anadromous fish habitat for migration and spawning. Common causes of erosion and excessive sedimentation include clearing land for development without adequate storm water controls, farming too close to creek banks or on steep slopes, and increased storm water runoff from impervious surfaces.
  - Degradation of riparian corridors through encroachment and poor land management practices reduces riparian vegetation, which leads to a reduction in shaded areas of a creek or stream. Without shade, water temperatures rise and dissolved oxygen levels decrease, and the riparian habitat for fish and aquatic life is severely compromised.

Published studies link invertebrate toxicity in the Central Coast to the pesticides chlorpyrifos and diazinon in water, and to chlorpyrifos and pyrethroids in sediment (Anderson et al., 2003a; Anderson et al., 2003b; Anderson et al., 2006a, Anderson et al., 2006b). A summary of toxicity work in the Central Coast Region, and all references can be accessed through the Ag wiki at http://www.ccamp.net/ag/index.php/Main_Page#Toxicity.

Additional information on overall water quality in the Central Coast region with a focus on agricultural impacts can be found in the Updated Conditional Waiver of Waste Discharge Requirement for Discharges from Irrigated Lands, Order No. R3-2012-0011 and viewed at http://www.waterboards.ca.gov/centralcoast/water_issues/programs/ag_waivers/index.shtml.

Watershed-Specific Issues

San Lorenzo River and Santa Cruz Area Watersheds

The San Lorenzo River and other streams flow from the Santa Cruz Mountains to the Pacific Ocean. The upper areas are heavily forested, and criss-crossed with many old logging roads that now serve rural residences. The natural processes of erosion and sedimentation in the San Lorenzo River watershed have been accelerated due to these anthropogenic watershed disturbances, accompanied by declines in anadromous fisheries and the quality of fish habitat. Fecal coliform exceeds the Basin Plan criteria in many streams and sloughs. The Santa Cruz area hydrologic unit has 33 water bodies on the 303(d) list, including the San Lorenzo River and many of its tributaries, Soquel Creek, Aptos Creek and the San Lorenzo River Lagoon.

Pajaro Watershed

The Pajaro River watershed encompasses over 1,300 square miles in four counties, and the river flows through diverse habitats. Water quality problems for the watershed and the river include erosion and sedimentation, pesticides, nutrients, heavy metals, pathogens, streambed flow alterations, endangered habitat, and riparian vegetation removal. Historically, agriculture has been the dominant land use in the watershed with the bottomlands supporting a mixture of intensive irrigated row cropping and orchards systems. Grazing is common in the remote areas of the watershed such as along the upper San Benito River. Agricultural lands are considered to be the major source of nutrient and sediment loading into the Pajaro River. Low-density residential development, flood control projects, sand and gravel and mercury mining, and off-road vehicle activity have also directly impacted water quality in the watershed.

Data collected in the Pajaro River watershed suggest that accelerated erosion and sedimentation is impacting steelhead habitat for migration and spawning. Fecal coliform levels in the Pajaro River and many of its tributaries exceed water quality objectives. Cyanobacteria are causing harmful algal blooms in Pinto Lake near the city of Watsonville. There are 29 water bodies are on the 303(d) list, including Coralitos Creek, Harkins Slough, the Pajaro River, Watsonville Slough, Llagas Creek, and Uvas Creek.

Elkhorn Slough Watershed

The Elkhorn Slough watershed in northern Monterey County includes the drainage areas tributary to Elkhorn and Moro Cojo sloughs. Water quality concerns include erosion, pesticides, bacteria, and scour. Surrounding agricultural activities and Moss Landing Harbor activities, including ongoing dredging, are impacting the slough. There are six water bodies on the 303(d) list, including Carneros Creek, Bennet Slough, and Moss Landing Harbor.

Carmel River Watershed

The Carmel River watershed drains approximately 200,000 acres of Monterey County south of Monterey Bay. The river flows northwestward through the Carmel Valley to the Carmel River lagoon and the Pacific Ocean. The Carmel Valley has a mixture of urban areas, rural residential, agriculture, rangeland and recreational areas. The upper reaches of the Carmel River, above the Los Padres Dam, flow through the Los Padres National Forest. Steelhead trout are common in the Carmel River, and there are currently no segments of the river or its tributaries that are identified as impaired on the CWA 303(d) list of impaired waters; however, water supply and habitat issues are major concerns. One water body in the Carmel watershed is listed on the 303(d) list: Tularcitos Creek.

Salinas River Watershed

The Salinas River watershed covers approximately 4,600 square miles within Monterey and San Luis Obispo counties, and is the region's largest watershed. The Salinas River originates in San Luis Obispo County, flows northwestward through Monterey County and empties into the Monterey Bay National Marine Sanctuary. The watershed's main tributaries are the Arroyo Seco, Nacimiento, San Antonio, and Estrella rivers. Agriculture is the dominant land use throughout the Salinas watershed, and has had serious impacts on water resources. Over the last 100 years, groundwater pumping for irrigation, has led to seawater intrusion nearly six miles inland near the Castroville area, and has necessitated the abandonment of several water supply wells. Additionally, nitrate contamination is widespread throughout the Salinas Valley Groundwater Basin. Surface water is also impacted by high levels of nitrate, as well as toxicity and pesticides.

The Salinas hydrologic unit has 32 water bodies on the 303(d) list, including the Salinas Reclamation Canal, Tembladero Slough, Blanco Drain, Espinosa Slough, segments of the Salinas River, Natividad Creek, Merrit Ditch, and Alisal Slough. These water bodies have been listed on the Clean Water Act's 303(d) list of impaired water bodies for fecal coliform, nutrients, toxicity and pesticides. Overall, fecal coliform bacteria impair recreational water uses of the lower Salinas River and its tributaries. Elevated nutrient concentrations have led to the degradation of municipal and domestic water supplies and have impaired most aquatic freshwater habitat beneficial uses for the lower Salinas River and its tributaries. The pesticides chlorpyrifos and diazinon are present in several areas at levels that are not protective of aquatic life- beneficial uses,-such as fish habitat, migration, spawning and development.

Santa Lucia Hydrologic Area/Big Sur

The Santa Lucia hydrologic area is located west of the Santa Lucia mountain ranges in Monterey County and is characterized by many small coastal streams that flow directly to the ocean. Because this area is located along the remote Big Sur coastline, many of the watersheds have little or no disturbance by agricultural or urban activities. Upper watersheds originate in the Los Padres National Forest, on the steep northwestern slopes of the Santa Lucia Mountains. Primary impacts in this forest stem primarily from roads, cattle grazing, fire management, inactive mines, and other sources of sediment. Rural residential uses are common at lower watershed elevations. No watershed in the Santa Lucia hydrologic area is currently listed on the Clean Water Act's 303(d) list of impaired water bodies.

Morro Bay

Morro Bay estuary lies to the south of Big Sur, and Morro Bay is one of the last relatively unaltered coastal wetlands along the central and southern California coast. The bay and estuary provide critical habitat for marine mammals, fish, shellfish, more than 200 species of birds, and other life, including 16 threatened and endangered species. The bay and its watershed encompass about 48,450 acres.

Over time, all estuaries eventually fill with sediment due to the natural processes of erosion and sedimentation. In Morro Bay, these natural processes have been accelerated due to anthropogenic watershed disturbances, resulting in impairment of biological resources and recreational uses. Water quality objectives for fecal coliform are also often exceeded, impairing recreational use and shellfish harvesting. The Estero Bay hydrologic unit, which includes Morro Bay, has 26 water bodies on the 303(d) list, including Chorro and Los Osos Creeks and many of their tributaries, and the Morro Bay Estuary. The tributaries Chorro and Los Osos Creeks to Morro Bay are considered impaired by nutrients, fecal coliform, sediment and low dissolved oxygen.

Santa Maria Watershed

At 1,880 square miles, the Santa Maria River watershed is the second largest watershed in the region. The Santa Maria valley is broad and flat, protected from flooding by levees and a series of flood control channels and basins. The lower Santa Maria River and its watershed have been highly altered, and land uses include rangeland, urban development, and irrigated agriculture. The Santa Maria watershed has 15 water bodies on the 303(d) list, including Bradley Canyon Creek, Blosser Channel, Orcutt Creek, Main Street Canal and the Santa Maria River. The Santa Maria River and its estuary, Oso Flaco Creek, the Bradley Channel, and the Main Street Canal are impaired by fecal coliform. Other impairments include nutrients, ammonia, salts, temperature, dissolved oxygen, toxicity, and pesticides. The Santa Maria watershed experiences extensive water column invertebrate toxicity, and the estuary undergoes routine toxic concentrations of chlorpyrifos.

Santa Ynez Watershed

The Santa Ynez River watershed in Santa Barbara County includes Lake Cachuma, the Santa Ynez River and other smaller tributaries within the area. Urban development, increased groundwater pumping, ranching, irrigated agriculture, and expanding recreational use have all contributed to the degradation of water quality. Major areas of concern include erosion, sedimentation, flood control and habitat loss (especially for steelhead). Summer flow in the lower Santa Ynez River is dominated by a wastewater treatment plant discharge from the City of Lompoc. Six water bodies are on the 303(d) list, including the Santa Ynez River, Salispuedes Creek, and Santa Rosa Creek. The Santa Ynez River is listed as impaired by nitrate, sodium, chloride, E. coli, fecal coliform, low dissolved oxygen, water temperature, and total dissolved solids.

Santa Barbara/South Coast

The South Coast watersheds consist of numerous coastal-drainage streams, which originate on the upper slopes of the south flank of the Santa Ynez mountain range in Santa Barbara County. Several of these streams flow through upland areas which contain grazing rangelands and orchards before flowing through more intensively developed land which includes the urban areas of Goleta, the City of Santa Barbara and Carpinteria. These are areas of mixed land use that include many greenhouses and nurseries. Routine monitoring of the ocean near stream outflows frequently finds levels of fecal coliform bacteria in violation of water quality standards, requiring the County's Environmental Health Services Department to close beaches to public access. Other water quality issues include sedimentation, pesticides and nutrients. There are 38 water bodies on the 303(d) list, including San Jose Creek, Jalama Creek, Canada del Refugio, Glen Annie Canyon, Mission Creek, Carpinteria Creek, Franklin Creek, and Rincon Creek.

Groundwater Quality

[PLACEHOLDER: Content on groundwater quality being developed]

Nitrate

The Central Coast region has widespread and severe groundwater nitrate pollution within areas of intensive agricultural land use as documented by numerous studies and regional monitoring data. The most significant areas of nitrate impact associated with irrigated agriculture are within the Salinas Valley, Gilroy-Hollister Valley, Pajaro Valley, and Santa Maria River Valley basins, and to a lesser extent within southern portions of the San Luis Obispo Valley and the Santa Ynez River Valley basins. Numerous lines of evidence indicate irrigated agriculture is the primary source of the ongoing nitrate pollution. Although less significant, nitrate pollution from point source municipal discharges and domestic septic systems can be locally relevant. In particular, localized nitrate pollution within the Langley Area and Corral de Tierra Area sub-basins of the Salinas Valley, and portions of the Los Osos Valley and Santa Ynez River Valley basins is likely attributable to higher-than-normal septic system densities and/or unfavorable soil conditions.

Salts

Although additional study is needed, there is a potential for significant regional-scale salt loading to groundwater from various point and non-point source discharges, particularly within areas with high agricultural and municipal wastewater return flows. Whereas salt impacts from seawater intrusion as a result of overdraft conditions are generally well defined, non-point source loading of salts and the

resulting impacts (increased soil and groundwater salinity) are relatively undefined in the Region. Historical studies indicate that agricultural operations are the leading source of salt loading to the Salinas and Pajaro Valley groundwater basins. To a lesser extent, analogous to the nitrate loading estimates, point source wastewater (both industrial and municipal) and septic system discharges also contribute to salt loading to groundwater within localized areas around these discharges.

Basin Overdraft/Seawater Intrusion

Groundwater overdraft within several Central Coast groundwater basins has resulted in seawater intrusion and the loss of riparian habitat due to insufficient base flows. Excessive pumping (primarily to meet agricultural demands) continues to cause seawater intrusion into the Salinas Valley and Pajaro groundwater basins, with increasing portions of these basins becoming unusable for agriculture and municipal supply. Seawater intrusion attributable primarily to over-pumping of groundwater for municipal supply has been documented in the Los Osos Valley groundwater basin. Excessive pumping of the Carmel Valley alluvial aquifer has resulted in the significant loss and degradation of riparian and aquatic habitat within both the Carmel River and Carmel River Lagoon, which are critical habitats for threatened steelhead trout.

Portions of the Gilroy-Hollister and Santa Maria River Valley basins are or were historically in overdraft, but changes in basin management practices appear to have stabilized- or caused a rebound in-groundwater levels within these basins. The Gilroy-Hollister, Salinas Valley, and Santa Maria River Valley groundwater basins are actively managed to enhance groundwater recharge in order to meet pumping demand and to offset pumping via recycled water use. Surface water diversions from the Salinas Valley Water Project to the Castroville Seawater Intrusion Project have reportedly offset additional pumping west of Salinas that will halt, if not push back, seawater intrusion in this area. Although these and other related conjunctive use projects can be effective, maximizing irrigation efficiency is essential given that irrigated agriculture accounts for a majority of groundwater pumping.

Groundwater Level Trends and Issues

[PLACEHOLDER: Content on groundwater quality being developed]

- [Key long-term groundwater level hydrographs for the Hydrologic Region with description of seasonal and long-term groundwater level trends and aquifer response to demand during wet, normal, and dry hydrologic conditions.
- Description of estimated annual change in groundwater in storage for 2005-2010, and for each pair of consecutive years (e.g., 2005-2006, 2006-07, etc.). For Hydrologic Regions where data are not available in DWR's Water Data Library or limited, identify this as a data gap.
- Map showing location of groundwater basins and associated change contours of groundwater levels and storage, subject to availability of information.
- Chart showing trends in annual and cumulative change in groundwater in storage, subject to availability of information.
- Table containing values for annual and cumulative change in groundwater levels and storage, subject to availability of information.

- Discussion and presentation of results from other related efforts for the Hydrologic Regions to estimate change in groundwater in storage, based on availability of data and information. These efforts may include local and regional agency groundwater modeling results and results from GRACE satellite analysis.
- Discussion of the historic land subsidence for the Hydrologic Region and the potential susceptibility for the future, if pertinent to the Hydrologic Region and subject to availability of data.
- General overview of aquifer sustainability based on above data and existing groundwater management practices. More detailed trends and assessment of sustainability indicators for Hydrologic Regions for which data or modeling results are available.]

Near Coastal Issues

Seawater Intrusion

Many coastal groundwater basins of the entire Central Coast have been, and continue to be, threatened by sea water intrusion.

Seawater intrusion in the northern Salinas Valley was first documented in 1933 by the California State Water Commission. Sea water intrusion was first identified in the Pajaro groundwater basin in the 1940s and current pumping now exceeds estimates of sustainable yield by more than 20,000 acre-feet per year. Seasonal groundwater withdrawals for agriculture in Santa Cruz and Monterey counties were recognized then and now as a contributing factor to seawater intrusion.

Further south, continued groundwater pumping in overdraft conditions is contributing to seawater intrusion along several coastal basins in San Luis Obispo County. Seawater intrusion is problematic in the community of Los Osos, where the impact of intrusion has been estimated to be migrating 100 feet per year. Recent studies show strong potential for seawater intrusion into the Nipomo area.

Several of the Santa Barbara County's groundwater basins are in a state of potential overdraft, notably, the Cuyama Groundwater Basin and the San Antonio Groundwater Basin. Santa Barbara and areas near Santa Maria have experienced signs of seawater intrusion, which at this time do not pose a threat to drinking water supplies.

Flood Management

The Central Coast has a long history of flooding in most of the region's rivers and creeks. Traditionally, the approach to flood management was to develop narrowly focused flood infrastructure projects. This infrastructure often altered or confined natural watercourses, which reduced the chance of flooding thereby minimizing damage to lives and property. This traditional approach looked at floodwaters primarily as a potential risk to be mitigated, instead of as a natural resource that could provide multiple societal benefits.

Today, water resources and flood planning involves additional demands and challenges, such as multiple regulatory processes and permits, coordination with multiple agencies and stakeholders, and increased environmental awareness. These additional complexities call for an Integrated Water Management approach, that incorporates natural hydrologic, geomorphic, and ecological processes to reduce flood risk by influencing the cause of the harm, including the probability, extent, or depth of flooding (flood

hazard). Some agencies are transitioning to an IWM approach. IWM changes the implementation approach based on the understanding that water resources are an integral component for sustainable ecosystems, economic growth, water supply reliability, public health and safety, and other interrelated elements. Additionally, IWM acknowledges that a broad range of stakeholders might have interests and perspectives that could positively influence planning outcomes.

An example of this is the Pajaro River Parkway Plan. This is a technical evaluation to identify public access and recreational opportunities that can be incorporated into the Levee Reconstruction Project. The plan will include an evaluation of expanding recreational opportunities within the Pajaro River levee reconstruction project area, engagement with the public, outreach and negotiation with landowners, development of alternatives, cost estimates, benefit analysis, environmental constraints analysis, and implementation plan

Risk Characterization

The Central Coast Hydrologic Region receives very little snow, floodwaters originate primarily from rainstorms. Flooding occurs most frequently in winter and spring. Streams draining the mountains of the Central Coast are subject to short, intense floods, causing frequent flood damage in agricultural and urban areas. Most streams produce slow-rise floods, but the steep terrain can produce flash floods that are intense and of short duration. The east-west-oriented Santa Barbara coast is situated such that storms could tend to persist and remain stationary near the coastline, producing high runoff and causing flash flooding. Such extended precipitation often produces debris flows, particularly after a season of hillside fire damage, and the steepness of the streams can increase the sediment size to boulder proportions. Storm surges that coincide with high tides and high runoff can cause coastal flooding in shoreline communities. Tsunamis typically have not been a severe damage threat, but they have occurred in the region. Communities might be subject to relatively shallow flooding due to stormwater runoff, which can be exacerbated by continuing urbanization. The presence of dams, levees, and other structural works occasionally leads to structure failure floods.

Historic Floods

Flood Descriptions

Slow-rise flooding is the overwhelmingly predominant type of flood in the Central Coast Hydrologic Region. Debris flows occur in most major storms, particularly when forest fires of the previous season have damaged vegetation. Tsunamis are infrequent but have been known to cause major devastation. Flash floods and coastal flooding also cause damage at times, and stormwater and structure failures occasionally occur. Flood damage has been observed in the Central Coast Hydrologic Region since at least 1861.

The region was included in a statewide inundation identified as “The Great Flood” in 1861-1862. During the Great Flood, the narrow coastal plains in Santa Barbara County were flooded. In San Luis Obispo County, many creeks overflowed, including Villa, Cayucos, Morro, Little Morro, Chorro, Los Osos, and San Simeon creeks. Up to 4 feet of floodwater was sustained in downtown San Luis Obispo, and widespread flooding damaged 142 homes, 110 businesses, 16 bridges, 1,800 acres of agricultural land, and many schools, parks, and other public properties, as well as utility and rail lines.

In 1937, Llagas Creek overflowed and damaged the Gilroy-Morgan Hill-San Martin area. There was regional inundation in February and March of 1938, and damages totaled $1.2 million. The December 1955 flood inundated 14,400 acres in the northern portion of the Central Coastal Hydrologic Region and caused $16 million in damage. In March and April of 1958, the Pajaro River severely eroded its levees, and the Carmel River flooded adjacent lands near State Highway 1. In December 1966 through January 1967, in the Salinas Valley, the Salinas River overflowed and damaged farmlands, industry, and to a lesser extent public facilities, businesses, homes, and its own banks. One life was lost, about 32,000 acres of agricultural lands were flooded, and USACE estimated $6.1 million in damages, approximately $1.1 million of which were in Santa Barbara County.

In January and February of 1969, a series of Pacific storms brought widespread damage to central and southern California. In the Central Coast Hydrologic Region, damage was most severe in the Salinas River and Santa Ynez River basins and in the Carpinteria-Montecito area. In January, both sides of the Salinas River flooded from San Ardo to Spreckels, destroying roads and bridges, flooding sewage treatment plants, and eroding farmland. The Carmel River overflowed and washed out a local bridge. In San Luis Obispo, businesses were damaged heavily when San Luis Obispo Creek became clogged with debris and overflowed. The Santa Maria River flooded lowlands west of Santa Maria. There was heavy damage at Lompoc, Solvang, and Vandenberg Air Force Base when the Santa Ynez River overflowed. Santa Monica, Franklin, and San Ysidro Creeks overflowed, causing heavy sedimentation and flood damage in Montecito and Carpinteria. Santa Ynez River flooding damaged Lompoc and Solvang extensively and inundated 4,000 acres of farmland.

In January-February of 1978, damage to homes and infrastructure occurred in San Luis Obispo County, notably in Corbit Canyon, where 20 homes were damaged, and on Arroyo Grande Creek. Damage also occurred on Pismo, Suey, Tar Spring, Prefumo, and Davenport creeks. In Santa Barbara County, erosion and deposition damaged channels and farmland along the Santa Maria River and other streams of the region. A flash flood washed away nine buildings, damaged infrastructure, and left debris deposits in Hidden Springs. Damage to roads, bridges, and farmland was extensive along the Cuyama River. In Santa Barbara County, San Antonio Creek damaged floodworks at Los Alamos and farmland elsewhere. Agricultural areas, parks, and infrastructure were damaged by flooding from the Santa Ynez River, notably at Lompoc. Landslides blocked Mission Creek causing an overflow that damaged Santa Barbara streets and an apartment building. Further damage occurred on San Ysidro, Romero, San Pedro, Atascadero, Tecolotito, Carneros, Gobernador, and Santa Monica creeks and Arroyo Paredo.

In January 1982, mudslides in the San Lorenzo basin destroyed 39 homes and damaged nearly 400 more, particularly in Felton, Ben Lomond, Brookdale, Lompico, and Boulder Creek. The San Lorenzo River washed out a bridge in Santa Cruz, damaging three main telephone cables, and a tributary ruptured a 24-inch water main serving the city. Local streams overflowed in Soquel and Aptos, damaging homes, businesses, and infrastructure. The Pajaro River inundated part of Watsonville and adjacent agricultural land. The Salinas River flooded residences along U.S. Highway 101 north of Salinas. In the Gilroy area, Llagas Creek breached levees of 10 sewage percolation ponds, and mudslides and washouts closed U.S. Highway 101 and State Highways 129 and 152. A list of major flood events in the Central Coast Hydrologic Region is the California's Flood Future Report Attachment C: Flood History of California Technical Memorandum.

Damage Reduction Measures

Flood exposure in the Central Coast Hydrologic Region occurs primarily along the Salinas River Basin, the Pajaro River, and along the coastline. Floods within the Central Coast region originate principally from winter storms and coastal flooding. Most flood events occur in December and January as a result of multiple storms and saturated soil conditions, but floods can occur in October and November or during the late winter or early spring months. Flood exposure identifies who and what is impacted by flooding. Two levels of flood events are commonly used to characterize flooding:

- **100-Year Flood** is a shorthand expression for a flood that has a 1-in-100 probability of occurring in any given year. This can also be expressed as the 1 percent annual chance of, or "1 percent annual chance flood" for short.
- **500-Year Flood** has a 1-in-500 (or 0.2 percent) probability of occurring in any given year.

In the Central Coast Hydrologic Region, more than 425,000 people and over $40 billion in assets are exposed to the 500-year flood event. Table CC-23 provides a snapshot of people, structures, crops, and infrastructure exposed to flooding in the region. Over 315 State and Federal threatened, endangered, listed, or rare plant and animal species exposed to flood hazards are distributed throughout the Central Coast Hydrologic Region. Table CC-23 lists the number of sensitive species exposed to flood hazards in 100-year and 500-year flood events.

PLACEHOLDER Table CC-23 Flood Exposure in the Central Coast Hydrologic Region Exposures to the 100-Year and 500-Year Flood Events

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

Levee Performance and Risk Studies

Flood hazard mitigation planning is an important part of emergency management planning for floods and other disasters. Hazard mitigation is defined as any sustained action taken to reduce or eliminate long-term risk to human life and property from hazards. Hazard mitigation planning is the process through which natural hazards that threaten communities are identified, likely impacts of those hazards are determined, mitigation goals are set, and appropriate strategies that would lessen the impacts are determined, prioritized, and implemented. Hazard mitigation planning is required for state and local governments to maintain their eligibility for certain Federal disaster assistance and hazard mitigation funding programs.

Multi-Hazard Mitigation Plans (MHMPs) are required by FEMA as a condition of pre- and post-disaster assistance. The Stafford Act, as amended by the Disaster Mitigation Act of 2000, provides for states, tribes, and local governments to undertake a risk-based approach to reducing risks to natural hazards through mitigation planning. The National Flood Insurance Act reinforced the need and requirement for mitigation plans linking flood mitigation assistance programs to State, tribal, and local mitigation plans. FEMA-approved MHMPs were identified or collected for Santa Barbara, Santa Clara, San Luis Obispo and Monterey counties, as listed in California's Flood Future Report. Other risk assessment studies were prepared by various entities including USACE, FEMA, and the State Reclamation Board of California. For a complete list of risk studies, refer California's Flood Future Report Attachment G: Risk Information Inventory Technical Memorandum.

In the Central Coast Hydrologic Region, forty-one local flood management projects or planned improvements were identified. Twenty-five of those projects have identified costs totaling approximately $280 million. The remaining projects are in the planning phase and do not have cost estimates. Twenty-eight local planned projects use an Integrated Water Management (IWM) approach to flood management. Examples of local IWM projects include the Coastal Wetland Erosion Control and Dune Restoration Project, the Lower Carmel River and Lagoon Floodplain Restoration and Enhancement Project and, the Salinas Valley Water Project. These identified projects and improvements are also summarized in the California's Flood Future Report Attachment E: Information Gathering Technical Memorandum.

Current Relationships with Other Regions and States

Implementation Activities (2009-2013)

Water Reliability in Santa Cruz County

An evaluation of water supplies and demands for the City of Santa Cruz and the Soquel Creek Water District indicated that a new water supply source will be necessary to meet the community demands, as well as to ensure adequate water during drought, to restore coastal groundwater levels to prevent seawater intrusion, and provide adequate in-stream flow for endangered fish. In 2010, both water systems completed a joint desalination pilot study to evaluate alternative treatment systems for a seawater reverse osmosis desalination plant.

Water Reliability in Monterey Peninsula

The Monterey Peninsula is exploring the development of new water supplies due to a water rights cease and desist order requiring Cal-Am Water Company (the major local water supplier) to reduce water diversion from the Carmel River and an adjudication of the Seaside groundwater basin requiring Cal-Am to reduce its groundwater pumping. The Monterey Peninsula Water Management District (MPWMD) estimates that 6,000 to 8,000 acre-feet per year on average need to be developed to replace the required reduction in water diversions from the Carmel River and Seaside Groundwater Basin. MPWMD has identified possible water supply projects which include the following: (1) aquifer storage and recovery (2 phases), (2) local desalination plant, (3) groundwater replenishment, and (4) expand storage at Los Padres Reservoir.

Upgrade of the City of Santa Barbara's Cater Water Treatment Plant

The City of Santa Barbara is currently constructing (December 2013 completion date) an ozone treatment facility, at their 37 MGD conventional surface water treatment plant, to replace chlorine as a pre-oxidant. They are also constructing a centralized groundwater treatment facility to maximize usage of their groundwater sources. These upgrades are needed to meet more stringent disinfection byproduct regulations.

Improve Water Quality in Northern San Benito County

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Drought Contingency Plans

[PLACEHOLDER: Groundwater content being developed providing description of components of the local drought contingency plans that call for increased groundwater use via groundwater

substitution water transfers or other conjunctive management practices, if pertinent to the Hydrologic Region.]

Resource Management Strategies

[PLACEHOLDER: Groundwater content to be developed]

[Contains

- Brief summary of DWR/ACWA joint survey and DWR's follow-up email and phone communications to conduct a survey to gather information on conjunctive management projects in the state.
- Description of the groundwater related conjunctive management projects for the Hydrologic Region.
- Table listing the conjunctive management projects.
- Dot Map showing location of the conjunctive management projects.
- Table showing responses on survey questions on conjunctive management projects.
- Charts showing projects by year project started, source of water, method of recharge, program goals, and potential constraints to conjunctive management, and other survey responses.
- Discussion on potential for conjunctive management in the Hydrologic Region subject to available aquifer space, source water, and infrastructure (conveyance, infiltration/injection, and extraction).
- Discussion on potential constraints to conjunctive management in the Hydrologic Region, including aquifer space, supply source, infrastructure, environmental, legal, regulatory, water quality, etc.]

PLACEHOLDER Table CC-24 Actions/Initiatives Implementing CWP RMS'

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Water Governance

[PLACEHOLDER: Groundwater content to be developed]

- [Brief description of the groundwater governance associated with the various GWMPs, IRWMPs, conjunctive management projects, groundwater recharge projects, groundwater monitoring, groundwater ordinances, and adjudicated groundwater basins within the Hydrologic Region.
- Table listing the above groundwater-related governance within the Hydrologic Region.
- Maps showing area coverage for GWMPs and IRWMPs, and "dot" locations of groundwater ordinances, adjudicated basins, and conjunctive management projects.
- Groundwater basin prioritization maps showing high, medium and low priority basins.]

Agencies with Responsibilities

California's water resource development has resulted in a complex, fragmented, and intertwined physical and governmental infrastructure. Although primary responsibility might be assigned to a specific local entity, aggregate responsibilities are spread among more than 135 agencies in the Central Coast

Hydrologic Region with many different governance structures. A list of agencies can be found in the California's Flood Future Report Attachment E: Information Gathering Technical Memorandum. Agency roles and responsibilities can be limited by how the agency was formed, which might include enabling legislation, a charter, a memorandum of understanding with other agencies, or ownership.

The Central Coast region contains floodwater storage facilities and channel improvements funded and/or built by State and Federal agencies. Flood management agencies are responsible for operating and maintaining 260 miles of levees, more than 70 dams and reservoirs and, more than 210 debris basins within the Central Coast Hydrologic Region. For a list of major infrastructure in this hydrologic region, refer California's Flood Future Report Attachment E: Information Gathering Technical Memorandum.

Flood Management Governance and Laws

Water Code Division 5, Sections 8,000 - 9,651 has special significance to flood management activities and is summarized in California's Flood Future Report Attachment E: Information Gathering Technical Memorandum.

Recently, a number of laws regarding flood risk and land use planning were enacted in 2007. These laws establish a comprehensive approach to improving flood management by addressing system deficiencies, improving flood risk information, and encouraging links between land use planning and flood management. Two of the Assembly Bills (AB) that the California legislature passed are summarized below.

- **AB 70 (2007) Flood Liability —** provides that a city or county might be responsible for its reasonable share of property damage caused by a flood, if the State liability for property damage has increased due to approval of new development after January 1, 2008.
- **AB 162 (2007) General Plans —** requires annual review of the land use element of general plans for areas subject to flooding, as identified by FEMA or DWR floodplain mapping. The bill also requires that the safety element of general plans provide information on flood hazards. Additionally, AB 162 requires the conservation element of general plans to identify rivers, creeks, streams, flood corridors, riparian habitat, and land that might accommodate floodwater for purposes of groundwater recharge and stormwater management.

]

State Funding Received

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Local Investment

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Water Conservation Act of 2009 (SB x7-7) Implementation Status and Issues

Interregional and Interstate Activities

[PLACEHOLDER: Groundwater content to be developed]

- [Description of interregional and interstate water resource planning activities that have identified increase use of groundwater in their planning (interstate examples include Klamath Basin for the North Coast Hydrologic Region, and the Honey Lake Basin for the North Lahontan Hydrologic Region).]

Looking to the Future

Future Conditions

Future Scenarios

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Climate Change

Climate change is already impacting many resource sectors in California, including water, transportation and energy infrastructure, public health, biodiversity, and agriculture (USGRCP, 2009; CNRA, 2009). Climate model simulations based on the Intergovernmental Panel on Climate Change (IPCC) 21st century scenarios, project increasing temperatures in California, with greater increases in the summer. Projected changes in annual precipitation patterns in California will result in changes to surface runoff timing, volume, and type (Cayan, 2008).

While the State of California is taking aggressive action to mitigate climate change through greenhouse gas (GHG) reduction and other measures (CARB, 2008), global impacts from carbon dioxide and other GHGs that are already in the atmosphere will continue to impact climate throughout the rest of the century (IPCC, 2007; UNEP, 2009). Resilience to an uncertain future can be achieved by implementing adaptation measures sooner rather than later. Due to the economic, geographical and biological diversity of the state, vulnerabilities and risks due to current and future anticipated changes are best assessed on a regional basis. Many resources are available to assist water managers and others in evaluating their region-specific vulnerabilities and identifying appropriate adaptive actions (EPA/DWR, 2011; CNRA, 2012).

Regional Temperature Trends

The Western Regional Climate Center (WRCC)* has been recording temperature and precipitation data for the past century. The Central Coast Hydrologic Region is covered by two WRCC regions - the Central Coast and San Joaquin Valley regions. Temperatures in the WRCC Central Coast region during the period of record indicate that a mean increase of about 1.1 – 2.0 °F (0.6 – 1.1 °C) has occurred, with minimum values increasing more than maximums [1.6 – 2.6 °F (0.9 – 1.4 °C) and 0.4 – 1.5 °F (0.2 – 0.8 °C), respectively]. Temperatures in the WRCC San Joaquin Valley region show a similar trend. A mean increase of 0.9 – 1.9 °F (0.5 – 1.0 °C) was recorded, with minimum temperatures increasing 2.0 – 3.0 °F (1.1 – 1.6 °C) compared to the mean maximum temperature trend, which was relatively stable.

Temperature, Precipitation, and Sea Level Rise Projections

Temperature projections from climate models are in wide agreement on a warming trend statewide. Future impacts by 2050 for the Central Coast Hydrologic Region are projected to include as much as a 1.0 – 2.0 °F (0.6 – 1.1 °C) increase in winter temperatures and a 2.0 – 3.0 °F (1.1 – 1.7 °C) increase in summer temperatures, under a high emissions scenario (Cal-EMA/CNRA, 2012). A recent highly sophisticated study of projected temperatures for 2070 indicates that the region could experience a 3.6 °F

(2.0 °C) increase overall, with an increase of 2.9 °F (1.6 °C) in mean winter temperatures and 4.0 °F (2.2 °C) in summer (Pierce et.al., 2012). By 2100, an increase of 4 – 5 °F (2.2 – 2.8 °C) in winter and 4-7 °F (2.2 – 3.9 °C) in summer are expected (Cal-EMA/CNRA, 2012).

Extreme precipitation events are projected to increase with climate change (Dettinger, 2012). Changes in annual precipitation across California, either in timing or total amount, will result in changes to the type of precipitation (rain or snow) in a given area, and to surface runoff timing and volume. Most climate model precipitation projections for the State anticipate drier conditions in southern California, with heavier and warmer winter precipitation in northern California. More intense wet and dry periods are anticipated, which could lead to flooding in some years and drought in others. Since there is less scientific detail on localized precipitation changes, there exists a need to adapt to this uncertainty at the regional level (Leung, 2012).

The National Research Council has projected that sea level will rise approximately 2-12 inches (4-30 cm) by 2030, 5-24 inches (12-61 cm) by 2050 and 17-66 inches (42-167 cm) by 2100 (NRC, 2012). For the Central Coast, approximately 66 percent of the region's water comes from groundwater, and salt water intrusion into the coastal groundwater aquifers is a current and historical problem. It is likely that, as sea level continues to rise and groundwater continues to be extracted, this problem will be exacerbated (Cal-EMA/CNRA, 2012).

Flood Risk

A recent study that explores future climate change and flood risk in the Sierra using downscaled simulations (computer projections refined to a scale smaller than global models), from three global climate models (GCMs) under a GHG scenario which is reflective of current trends, indicates a tendency toward increased 3-day flood magnitude. By the end of the 21st century, all three projections yield larger floods for both the moderate elevation northern Sierra Nevada watershed and for the high elevation southern Sierra Nevada watershed, even for GCM simulations with 8–15% declines in overall precipitation. The increases in flood magnitude are statistically significant for all three GCMs for the period 2051–2099. By the end of the 21st century, the magnitudes of the largest floods increase to 110% to 150% of historical magnitudes. These increases appear to derive jointly from increases in heavy precipitation amount, storm frequencies, and days with more precipitation falling as rain and less as snow. The frequency of floods by the end of this century increased for two of the models, but remained constant or declined for the third model (Das et al., 2011). While this study focused on the Sierra Nevada, these scenarios could potentially be indicative of other regional settings with flood risks.

Ecosystem Services and Agriculture

Critical habitats in the region such as near-shore ecosystems and estuaries will be impacted by sea level rise. Coastal infrastructure will be particularly vulnerable to increased storm surges. For Central Coast counties, the estimated increase in acreage vulnerable to flooding is 36 percent in Santa Barbara, 15 percent in San Luis Obispo, 12 percent in Santa Cruz, and 11 percent in Monterey (Cal-EMA/CNRA, 2012). It is anticipated that these storm surge events, which will result in flooding and erosion, will be more damaging to the coastline than the gradual sea level rise that California is experiencing (CNRA, 2009), and these changes to the coastline will likely have a significant economic impact on the region’s coastal tourism industry.

Agricultural crops in the region, particularly wine and table grapes, almonds, and avocadoes, will be affected by the increase in average temperatures as well as variations in the timing and amount of precipitation (USGRCP 2009). For the Central Coast, approximately 80% of the region's drinking and irrigation water comes from groundwater, and salt water intrusion into the coastal groundwater aquifers is a current and historical problem. As sea level continues to rise and groundwater continues to be extracted, this problem may be exacerbated (CNRA, 2012). Heat waves, defined as five days over 79 to 85 degrees along the coast and 99 to 101 degrees F inland, are expected to occur three to four more times inland by 2050. By 2100, they are expected to occur four to eight times more often in coastal areas and eight to ten times more often in inland areas (Cal-EMA/CNRA 2012). Wildfire risk will increase, with as much as a 200-350% increase in the area burned in 2085 compared to historic amounts (Westerling, 2009).

Adaptation

Local agencies, as well as federal and state agencies, face the challenge of interpreting new climate change data and information and determining which adaptation methods and approaches are appropriate for their planning needs. The Climate Change Handbook for Regional Water Planning (EPA/DWR, 2011) provides an analytical framework for incorporating climate change impacts into the regional and watershed planning process and considers adaptation to climate change. This handbook provides guidance for assessing the vulnerabilities of California's watersheds and hydrologic regions to climate change impacts, and prioritizing these vulnerabilities.

Additional Tools and Resources

The State of California has developed additional tools and resources to assist resource managers and local agencies in adapting to climate change, including:

- California Climate Adaptation Strategy (2009) - California Natural Resources Agency (CNRA) at: http://www.climatechange.ca.gov/adaptation/strategy/index.html
- California Climate Change Adaptation Planning Guide (2012) - California Emergency Management Agency (Cal-EMA) and CNRA at: http://resources.ca.gov/climate_adaptation/local_government/adaptation_planning_guide.html
- Cal-Adapt website at: http://cal-adapt.org/
- Urban Forest Management Plan (UFMP) Toolkit - sponsored by the California Department of Forestry and Fire Management at: http://ufmptoolkit.com/
- California Climate Change Portal at: http://www.climatechange.ca.gov/
- DWR Climate Change website at: http://www.water.ca.gov/climatechange/resources.cfm
- The Governor's Office of Planning and Research (OPR) website at: http://www.opr.ca.gov/m_climatechange.php.

Strategies

The myriad of resources and choices available to managers can seem overwhelming, and the need to take action given uncertain future conditions is daunting. However, there are many 'low-regrets' actions that water managers in the Central Coast Hydrologic Region can take to prepare for climate change, regardless of the magnitude of future warming (GEOS/LGC, 2010). These actions often provide economic and public health co-benefits. Water and energy conservation are examples of strategies that make sense with or without the additional pressures of climate change. For the Central Coast region, developing adaptive management plans to address the impacts of sea level rise on groundwater supplies and coastal geomorphology should serve to facilitate the gradual land-ward retreat of the region's vulnerable coastal municipal and urban infrastructure (DWR, 2008; Cal-EMA and CNRA, 2012).

Many of the Resource Management Strategies from California Water Plan Update 2009 (Volume 3) provide benefits for adapting to climate change in addition to meeting water management objectives. These include:

- Agricultural/Urban Water Use Efficiency
- Conveyance – Regional/local.
- System Reoperation.
- Conjunctive Management and Groundwater Storage.
- Precipitation Enhancement.
- Surface Storage – Regional/Local.
- Pollution Prevention.
- Agricultural Land Stewardship.
- Ecosystem Restoration.
- Forest Management.
- Land Use Planning and Management.
- Recharge Area Protection.
- Watershed Management.
- Flood Risk and Integrated Flood Management.

The Central Coast Hydrologic Region contains a diverse landscape with different climate zones, making it difficult to find one-size-fits-all adaptation strategies. Water managers and local agencies must work together to determine the appropriate planning approach for their operations and communities. While climate change adds another layer of uncertainty to water planning, it does not fundamentally alter the way water managers already address uncertainty (US EPA and DWR, 2011). However, stationarity (the idea that natural systems fluctuate within an unchanging envelope of variability) can no longer be assumed, so new approaches will likely be required (Milly, et al., 2008). Whatever approach is used, it is necessary for water managers and communities to start implementing adaptation measures sooner rather than later in order to be prepared for an uncertain future.

Local Planning

Integrated Regional Water Management (IRWM) planning is a framework that allows water managers to address climate change at the regional scale. Climate change is now a required component of all IRWM plans (DWR, 2010 and 2012) and IRWM regions should begin addressing climate change by performing a vulnerability assessment. This assessment will help each IRWM region to identify and prioritize their specific vulnerabilities, and identify adaptation strategies that are most appropriate for each region and sub-region. Planning strategies to address vulnerabilities and adaptation to climate change should be both

proactive and adaptive, starting with low-regrets strategies that benefit the region in the present-day while adding future flexibility and resilience under uncertainty.

Water managers need to consider both the natural and built environments as they plan for the future. Stewardship of natural areas and protection of biodiversity are critical for maintaining ecosystem services important for human society such as flood management, carbon sequestration, storm water pollution remediation, as well as, habitat for the pollinators of our natural and agricultural landscapes. Increased cross-sector collaboration between water managers, land use planners and ecosystem managers provides opportunities for identifying common goals and actions needed to achieve resilience to climate change and other stressors.

Mitigation

This is the first California Water Plan to include specific energy intensity information related to water. There is a need to mitigate for climate change by reducing the greenhouse gas (GHG) emissions related to water usage, and comparing energy intensity of various water supplies when making portfolio choices. While both adaptation and mitigation are needed to manage risks and are often complementary and overlapping, there may be unintended consequences if efforts are not coordinated.

When making water management choices, the energy intensity of individual supplies can become part of the decision making process. Figure 13 indicates relative energy intensity of raw water extraction and conveyance for the primary water supply sources for this region (caption and footnotes under development). It provides a tool to assist decision making in water management regarding water and energy efficiency and to help evaluate what type of water supply portfolio should be used to meet demand within the hydrological region.

PLACEHOLDER Figure CC-13 Energy Intensity Light Bulbs in Central Coast

FIGURE TO COME

[Any draft tables, figures, and boxes that accompany this text for the advisory committee draft are included at the end of the chapter.]

[Interregional and Interstate Planning Activities]

[PLACEHOLDER: Integrated Flood Planning content to be developed]

Flood Risk Characterization

Flood Risk

Flooding can deliver either environmental destruction or environmental benefits. Ecosystems can be devastated by extreme floods that wash away habitat, leaving deposits of debris and contaminants. Development in floodplains has reduced the beneficial connections between different types of habitat and adjacent floodway corridors; however, well functioning floodplains deliver a variety of benefits. Floodplains provide habitat for a significant variety of plant and wildlife species. Small, frequent flooding can recharge groundwater basins and improve water quality by filtering impurities and nutrients, processing organic wastes, and controlling erosion.

Typically, flood management agencies in large urban areas tend to be highly organized. Agencies in more rural counties or with low exposure to flooding are often handled by emergency responders or a single contact at the county. This can present a unique set of challenges when developing a project. Flood management in the Central Coast Hydrologic Region of California has a unique set of challenges that were identified during meetings with local agencies in the hydrologic region. These challenges include:

- Impacts of sea level rise.
- Operations and maintenance costs.
- Environmental regulations that restrict the ability of agencies to utilize options for flood management.
- Inconsistent and unreliable funding.
- Inadequate access to training and/or experienced flood managers.
- Difficulty quantifying the benefit (intangible) of improved habitat and other intangible aspect of a project to prove that the project provides a net benefit.
- Inadequate agency alignment and inconsistent agency roles and responsibilities.
- Inadequate public awareness about flood risk.
- Land use planning and economic pressures promote development in the floodplain in some areas.
- Permitting that is costly and difficult to navigate.

The identified issues were based upon interviews with eight agencies of varying levels of flood management responsibilities in each county of the region. For a list of agencies with flood management responsibility in the Central Coast Hydrologic Region that participated in these meetings, refer California's Flood Future Report Attachment E: Information Gathering Technical Memorandum. The information gathered from local agencies was used to help improve the process and better understand the local needs throughout the state

Future Vision

[Regional Future Vision]

[Tribal Objectives/Vision]

Relevant Statewide Interests and Objectives

Regional Water Planning and Management

The Central Coast Water Board has developed and is pursuing the following measurable goals for the Central Coast Region, based on its vision of healthy watersheds:

1. Healthy Aquatic Habitat - By 2025, 80 percent of aquatic habitat is healthy, and the remaining 20 percent exhibits positive trends in key parameters.
2. Proper Land Management - By 2025, 80 percent of lands within any watershed will be managed to maintain proper watershed functions, and the remaining 20 percent will exhibit positive trends in key watershed parameters.
3. Clean Groundwater - By 2025, 80 percent of groundwater will be clean, and the remaining 20 percent will exhibit positive trends in key parameters.

The Central Coast Water Board recognizes the importance of healthy, functioning watersheds in the protection of water quality. Healthy watersheds function well ecologically and are sustainable; support

healthy, diverse aquatic habitat; have healthy riparian areas and corridors; and have near natural levels of sediment transport and near natural levels and quality of groundwater. In order to address the most significant water quality problems within the Region as they relate to the measurable goals, the Central Coast Water Board has affirmed the following as its highest priorities:

- Preventing and Correcting Threats to Human Health.
- Preventing and Correcting Degradation of Aquatic Habitat .
- Preventing Degradation of Hydrologic Processes.
- Preventing/Reversing Seawater Intrusion.
- Preventing Further Degradation of Groundwater Basins from Salts.

Integrated Regional Water Management Coordination and Planning

The Central Coast region is actively engaged in Integrated Regional Water Management (IRWM) planning and implementation of water projects. The goal of IRWM is to meet regional water management challenges by developing integrated solutions and diversified water management portfolios through the collaboration of the region's stakeholders and by planning at the regional scale. The IRWM efforts serve a vital role, in combination with local and statewide planning, to provide for sustainable water use, water quality, and environmental functions. Find information about the program at www.water.ca.gov/irwm/.

[PLACEHOLDER: Groundwater content to be developed]

- [Provide summary of the GWMPs for the Hydrologic Region with brief description of overlap, management gaps, and degree of coordination.].

Flood management in the future will require unprecedented integration among traditionally varying agencies that have overlapping and sometimes conflicting goals and objectives. More reliable funding and improved agency alignment are required at all levels. Updated technical and risk management approaches will be needed to protect the public from flooding by assessing risk, as well as by improving flood readiness, making prudent land use decisions, and promoting flood awareness. Project implementation methods could benefit from IWM-based approaches to leverage the limited funding and other flood management resources. In short, future solutions should be aligned with broader watershed-wide goals and objectives and must be crafted in the context of IWM

Integrated Regional Water Management (IRWM) promotes the coordinated development and management of water, land, and related resources to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. Flood management is a key component of an integrated water management strategy.

Accomplishments

Davenport Water Treatment Plant Improvements

The Davenport County Sanitation District completed construction of a new membrane filtration system and water tank for the Davenport drinking water system. The project was needed to replace its inadequate drinking water treatment plant that no longer met state and federal standards. Davenport is considered a disadvantaged community and received ARRA grant funding for the project.

San Jerardo Water System Improvements Project

Construction was completed on a new well, transmission pipelines, water storage tank and booster pump station for the community of San Jerardo. The community was previously on a bottled water order since 2001, since its well was contaminated with both nitrate and trichloropropane (TCP). San Jerardo is considered a disadvantaged community.

Lake Nacimiento Regional Pipeline Project

San Luis Obispo County completed construction of a 45 mile raw water transmission pipeline with the ability to deliver 15,750 acre-feet per year of raw water to the communities of Paso Robles, Templeton, Atascadero, and San Luis Obispo.
http://www.slocounty.ca.gov/PW/NacWP/General_Project_Information.htm.

Water Quality Accomplishments in the Central Coast Region, 2009-2013

The Central Coast has many important collaborative efforts to protect and enhance water quality. These partnerships leverage Central Coast Regional Water Quality Control Board (CCRWQCB) staff work by bringing stakeholders and experts together to find funding and implement projects that improve water quality, provide habitat and enhance watershed functions. The CCRWQCB supports these and other efforts through grant and settlement funding and participation on technical advisory committees. Below is a list of notable partnership efforts across the region, and some of their recent projects and accomplishments.

The Integrated Watershed Restoration Program (IWRP)

IWRP began in Santa Cruz County in 2003 and has now expanded to include San Mateo and Monterey counties. The IWRP brings together local, state and federal partners to provide technical and financial assistance for multi-benefit restoration projects. IWRP has begun or completed approximately 30 projects in Santa Cruz County creeks since 2009, including projects to restore riparian and wetland habitat, and projects to aid steelhead and coho salmon recovery by improving in-stream habitat, reducing sediment delivery to creeks, and removing barriers to migration. Direct water quality benefits from these projects include erosion reduction, sediment capture, increased in-stream dissolved oxygen levels and lower summer in-stream water temperatures.

IWRP's largest restoration project to date will protect and restore 70 acres of marginal farmland in Watsonville Slough and will be completed in 2013. This project is the culmination of nearly eight years of work with landowners and growers, and represents a partnership between Santa Cruz Resource Conservation District, the Land Trust of Santa Cruz, USDA's Natural Resources Conservation Service, US Fish and Wildlife Service's Coastal Program and the Coastal Conservancy. The project will provide a mosaic of wetland and upland habitats and provide breeding, nesting and foraging habitat and migration corridors for sensitive species of amphibians. http://iwrp.rcdsantacruz.org/about/index.html#evol.

Elkhorn Slough Foundation

The Elkhorn Slough Tidal Wetland Project is a collaborative effort to develop and implement conservation and restoration strategies for critical estuarine habitats in Elkhorn Slough- the largest tract of tidal salt marsh in California outside of San Francisco Bay. Initiated in 2004, the project involves over 100 coastal resource managers, scientific experts, agency representatives and community members. In 2011, the Tidal Wetlands Project completed the Parsons Slough Sill project. The sill is acting to reduce

erosive tides and prevent thousands of cubic yards of sediment from washing into the bay each year. It is anticipated that this project will result in restoration of an additional seven acres of tidal marsh. http://www.elkhornslough.org/.

Agriculture Water Quality Alliance (AWQA)

The Agriculture Water Quality Alliance is a partnership of agriculture industry groups, resource conservation agencies, researchers, and environmental organizations working toward protection of the Monterey Bay National Marine Sanctuary and the adjacent watersheds while sustaining the economic viability of agriculture throughout the Sanctuary's watersheds. In 2009, AWQA received funds from USDA to assist farmers in implementing improved irrigation and nutrient management practices. In the first two years, the program helped 71 growers install 384 conservation practices, treating 12,423 acres to reduce runoff and leaching of nutrients, and conserve water. Additional information can be found at: http://www.awqa.org/ and http://www.awqa.org/farmers/AWEP.html.

Morro Bay National Estuary Program (MBNEP)

Morro Bay is designated as a national estuary (one of 28 in the nation) and is the largest relatively undisturbed estuary along the southern and central California coast. MBNEP is a multi-stakeholder program that works with agencies, landowners, and researchers to protect the bay and its watershed. Water quality problems include increased sedimentation, bacteria and nutrients. The CCRWQCB has adopted several TMDLs for the bay and its tributaries. By working with landowners and managers to implement rangeland and road improvements, and wetland enhancement projects, MBNEP has been able to prevent thousands of tons of sediment from reaching the bay. A recently completed project by MBNEP, in coordination with local ranchers, implemented off-stream water supplies and fencing to keep cattle out of San Luisito Creek, a subwatershed of the bay. The project resulted in a significant drop in bacterial levels in the stream by 2010, and a potential de-listing by 2013. http://www.mbnep.org/index.html.

Santa Cruz Resource Conservation District: Reducing Sediment from Rural Roads

Santa Cruz Resource Conservation District began a rural roads cost-share funding program several years ago and completed the third phase in 2010. This program has helped landowners implement practices to reduce erosion on mountainous roads in rural Santa Cruz County. The RCD estimates that the most recent phase of the program is preventing nearly 900 tons of sediment per year from entering steelhead and salmon-bearing river systems.

Ecology Action of Santa Cruz: Reducing Sediment, Pathogens and Nutrients from Small Livestock Operations

Ecology Action of Santa Cruz is implementing a multi-phase project to assist landowners with implementing management practices to reduce impacts from small livestock operations, which are common in rural areas throughout the region. Livestock facilities have been shown to contribute significantly to impairment of local waterways through contribution of nutrients, pathogens and sediment. For example, in the San Lorenzo river mouth, livestock contributes 30% of the known pathogen sources. Practices implemented include vegetated swales and buffer strips, manure containment, and revegetation. Since the three grant projects have been implemented, hundreds of tons of manure and hundreds of pounds of nutrients have been kept out of Central Coast waterways.

Improving Irrigation and Nutrient Management on Farm Lands

Three million dollars of Proposition 50 and Proposition 84 grant funding has been allocated to the Santa Cruz County Resource Conservation District, the Monterey Bay Sanctuary Foundation and the Cachuma Resource Conservation District for irrigation and nutrient management practice implementation on agricultural lands in the Pajaro, Salinas, and Santa Maria River watersheds, respectively. Grants provide cost-share assistance for practices such as irrigation system conversions and tailwater treatment, and will serve as a model for agricultural BMP implementation.

Clean Water Act Section 319(h) Nonpoint Source Pollution Control Program grant funds have been awarded to the Coastal San Luis Resource Conservation District to implement agricultural water quality improvement projects on rangeland and farms that will result in significant sediment, nutrient, and pesticide pollutant loading reductions to Morro Bay.

Agricultural Sustainability: CCVT SIP Certification

In 1996, a group of Central Coast wine-grape growers pioneered an innovative whole-farm assessment system to assess vineyard sustainability. In 2008, the Central Coast Vineyard Team (CCVT) program launched a sustainability certification program, wherein third-party auditors assess the sustainability of the entire wine-growing operation. Those that meet the Sustainability in Practice (SIP) certification requirements are eligible to use the SIP seal on their wine. Currently, there are 27,000 acres certified and 300,000 cases of wine bearing the SIP seal. http://www.vineyardteam.org/sip.

Low Impact Development

Under the guidance of the Low Impact Development Center, the following LID projects are underway:

1. A redesign of the parking lot at the Atascadero Zoo to incorporate pervious pavement, rain gardens and native vegetation to mimic the processes and functions of natural systems, allowing storm water to slow, spread and sink in. Such design features increase recharge of aquifers and filter pollutants. Additional features, such as trees and other vegetation, will provide aesthetic, cooling, and storm water management functions.
2. The Paso Robles 21st Street Complete Green Street, is a project to redesign a street near the Paso Robles Event Center that was built in a natural drainage-way and currently floods during large storms. The planned and funded project will reduce the volume and intensity of storm water runoff, increase groundwater recharge, improve pedestrian and bicyclist mobility, shade the street and promote redevelopment.

Removing Water Quality Impairments through Implementing TMDLs

The Central Coast region has many water bodies that are listed on the Clean Water Act Section 303(d) list of impaired water bodies. Total Maximum Daily Load (TMDL) development and implementation is a high priority. In 2010, the CCRWQCB was able to remove Chorro Creek (a tributary to Morro Bay), from the 303(d) list as a result of improvement in dissolved oxygen levels. The delisting was a result of actions by a discharger, several landowners, and the Morro Bay National Estuary Program. Actions included upgrade of a waste water treatment plant, restoration of a segment of Chorro Creek, and several stream fencing projects in tributaries. Dissolved oxygen is now meeting water quality standards, and nutrient and pathogen levels are declining.

Groundwater Cleanup

During the period from 2009 through 2011, 184 groundwater cleanups were completed, including 145

leaking underground fuel storage tanks and 39 other groundwater cleanup cases, such as dry cleaners and munitions production facilities. Groundwater cleanup is necessary to protect drinking water supplies throughout this groundwater-dependent region. For example, a cleanup remedy is currently underway in the Llagas groundwater basin in southern Santa Clara County, where potassium perchlorate from a facility that manufactured signal flares created a contaminant plume that reached 10 miles in length and polluted 188 domestic wells. The Water Board ordered cleanup in 2007, and by 2010, over 255 million gallons of groundwater had been treated and 176 of the polluted domestic wells were meeting the drinking water standard for percholorate (94%).
http://www.waterboards.ca.gov/rwqcb3/board_info/agendas/2011/July/Item9/9_stfrpt.pdf.

[PLACEHOLDER: Groundwater content to be developed]

- [Discussion of the GWMPs within the Hydrologic Region that are SB 1938 compliant. Highlight key aspects of effective groundwater management and conjunctive management efforts in these areas.
- Map showing high priority basins in the Hydrologic Region that are covered with SB 1938 compliant GWMPs.]

[Case Studies: a) in groundwater management accomplishments/challenges associated with various groundwater aquifer conditions (declining aquifer, coastal aquifer, poor water quality aquifer, fractured rock aquifer, etc.);b) that illustrate potential and challenges associated with resources management strategies such as conjunctive management and groundwater storage; and c) that illustrate successes and challenges associated with implementation of groundwater legislation.]

In the Central Coast Hydrologic Region, a number of flood risk management recommendations were accomplished including:

- DWR has created a climate change handbook to help local agencies incorporate climate change into planning activities. In addition, the State of California has developed a statewide climate change adaptation strategy, requested that the National Academy of Science establish an expert panel to report on impacts of sea level rise, and issued interim guidance to agencies on planning for sea level rise in designated coastal and floodplain areas.
- DWR has collaborated with the USACE to produce *California's Flood Future: Recommendations for Managing the State's Flood Risk*, which will help guide local, State, and Federal decisions about policies and financial investments related to improved public safety and flood management throughout California. Information for the California's Flood Future Report was provided by 142 public agencies located in all 58 counties, as well as by State and Federal agencies.
- IRWM planning guidelines were revised to incorporate flood management into the process giving credit for including these flood benefits in Integrated Water Management projects.
- Comments and recommendations from the Flood Risk Management Strategy in the 2009 California Water Plan were used to inform:
  - SFMP California's Flood Future Report
  - IRWM planning
- Water Code Section 8307 links flood liability with local planning decisions. Cities and counties now share flood litigation liability with the State over unreasonably approved new development on previously undeveloped areas.

Challenges

Water Reliability in Monterey Peninsula

The drinking water supply of the Monterey Peninsula faces required significant reduction in supply from the Carmel River and Seaside Groundwater Basin. The Monterey Peninsula should continue to promote water conservation practices and continue to explore the development of new water supplies to meet existing water demands.

Disadvantaged Community Water Systems

Disadvantaged communities in the region often cannot provide the economies of scale necessary to construct, operate and maintain new water facilities to meet drinking water standards. Recent grant funding has assisted some systems to begin design and construction of these needed projects, however not all projects were funded. Additional grant funding is needed to assist these and future projects.

Proposition 218

Water and wastewater systems in the region continue to plan, design and complete upgrades to their water and wastewater systems in order to meet stricter drinking water and wastewater regulations. These upgrades typically require rate increases from rate payers who may challenge these rate increases through the Proposition 218 process. The required system upgrades may be jeopardized if the rate increases are overturned, which may result in continued violations of drinking water or wastewater effluent standards or continued deterioration of water system facilities that have outlived their useful life.

Disposal of Drinking Water Treatment Waste Products

Disposal of drinking water treatment waste products can significantly increase treatment costs that are ultimately passed on to rate payers. When selecting drinking water treatment alternatives, especially for arsenic, water systems must consider the cost to dispose of drinking water treatment waste products such as backwash water or spent filter media. Spent filter media must be evaluated under the California Waste Extraction Test (WET), which is more stringent than the federal leaching tests, for classification prior to determining appropriate disposal options. Some spent filter media can even be classified as a hazardous or radioactive waste due to the concentration and leaching characteristics of the contaminant.

Protecting Groundwater Basins

A major challenge in the Central Coast is protecting groundwater basins. The decades-long accumulation of nitrates in the groundwater basins of the Salinas, Pajaro and Santa Maria watersheds, as the result of the intensive, year-round agriculture that produces the majority of the nation's lettuce, celery, cabbage and strawberries, and the associated irrigation demands threatens the sustainability of the region's main source of water. Central Coast groundwater basins supply not only irrigation water, but drinking water to the majority of the region's population. Growing urbanization is adding to the water demand and contributing salts and other pollutants to our groundwater basins.

Ecological Integrity

A further challenge is protecting and restoring the ecological integrity of the region's streams and rivers, which are habitat for threatened and endangered coho and steelhead, as well as many other species. Protecting groundwater recharge areas and riparian corridors is the key to well-functioning stream systems.

[PLACEHOLDER: Groundwater content to be developed]

- [Summary of the number of GWMPs that are not SB1938 compliant, or only partially SB 1938 compliant. The challenges associated implementing the SB 1938 groundwater management criteria, and recommendations for improving or incorporating sustainable practices into local groundwater management.
- Map showing high priority basins for the Hydrologic Region those do not have SB 1938 compliant GWMPs. The map shows overall area without compliant groundwater management planning, not area of individual groundwater basins.
- Summary of lessons learned from various Case Studies.]

Typically, flood management agencies in large urban areas tend to be highly organized. Agencies in more rural counties or with low exposure to flooding are often handled by emergency responders or a single contact at the county. This can present a unique set of challenges when developing a project. Flood management in the Central Coast Hydrologic Region of California has a unique set of challenges that were identified during meetings with local agencies in the hydrologic region. These challenges include:

- Impacts of sea level rise
- Operations and maintenance costs
- Environmental regulations that restrict the ability of agencies to utilize options for flood management
- Inconsistent and unreliable funding
- Inadequate access to training and/or experienced flood managers
- Difficulty quantifying the benefit (intangible) of improved habitat and other intangible aspect of a project to prove that the project provides a net benefit
- Inadequate agency alignment and inconsistent agency roles and responsibilities
- Inadequate public awareness about flood risk
- Land use planning and economic pressures promote development in the floodplain in some areas
- Permitting that is costly and difficult to navigate

Climate change will have a significant impact on the timing and magnitude of precipitation and runoff and will contribute to a rise in sea levels. Increased air temperatures could reduce the extent of snow pack in mountainous areas, thereby adding to the portion of watersheds that are available to contribute to direct winter runoff. Decreased snow pack would also reduce spring runoff volumes. Although future precipitation is somewhat uncertain, greater flood magnitudes are anticipated due to more frequent atmospheric river storm events (Dettinger, 2011). These changes could alter the magnitude and frequency of flood events, although specific effects might be difficult to reliably predict. However, the potential for increased frequency and magnitude of floods and a rise in sea level suggest that the enhancement of both structural and nonstructural measures for flood management is needed.

Drought and Flood Planning

[Highlight discussion of the areas of water planning and management related to the extremes, drought and flood.]

Resource Management Strategies

[Note: (1) Align with resource management strategy impacts and benefits of IRWM standards. (2) Information for this section will be regionally derived. The "statewide" strategies (i.e., the updated text from Volume 2 of Update 2009) will be published in a separate volume, not in these regional reports.]

[Strategy Availability]

Regional Strategies

[PLACEHOLDER: Groundwater content to be developed]

- [Discussion of the various existing groundwater related management strategies as it relates to groundwater management plans and IRWM plans, as well as conjunctive management projects and groundwater recharge projects, etc.
- Table listing the existing groundwater related management strategies.]

Water Quality Recommendations

Below are some recommendations which, if implemented on a regional scale, will protect water quality and public health, as well as promote sustainable water supplies, and will also significantly improve our ability to measure our performance in protecting and restoring our groundwater resources. Most require coordination and cooperation among many entities, and may entail changes in policy as well.

Groundwater Recharge Area Protection

The Central Coast Region relies heavily on groundwater for drinking water and agricultural irrigation. Groundwater recharge area protection provides effective prevention of groundwater degradation. Preservation of groundwater quality in source areas will be accomplished by identifying and protecting groundwater recharge locations.

- Identify and map recharge areas (consistent with AB 359, Huffman 2011)
- Develop local and statewide land use management requirements (e.g., ordinances, regulations, Basin Plan amendments, etc.) to protect and restore recharge areas.
- Implement programs and projects to increase the amount of clean water recharge (e.g., Low Impact Development).
- Utilize Integrated Regional Water Management to address complex issues, such as infiltration management, basin recharge, etc.

Regional/Basin-wide Groundwater Monitoring and Assessment

Understanding of the quality and quantity of water in our groundwater basins is essential to successful management of resources. The following strategies will provide increased data availability/transparency and use:

- Coordinate with local agencies to build on existing programs and develop programs where they are lacking.
- Improve data management - build on GeoTracker GAMA as the centralized database to consolidate groundwater quality, well and hydrogeologic data (e.g., water quality data, well construction, CASGEM, etc.)

- Develop monitoring programs for shallow groundwater (i.e., first encountered groundwater or uppermost aquifer).
- Implement drinking water quality monitoring requirements, with reporting into GeoTracker, for the most at-risk population of water users who rely on domestic wells and local small and state small water systems/wells for their potable supply.

Source Control of Nitrate and Salt Loading to Groundwater

The significant and ongoing loading of nitrate and salts is the largest threat to public health and groundwater quality within the region. Irrigated agriculture is the most significant source of loading.

- Implement the Central Coast's Irrigated Lands Regulatory Program to monitor and reduce pollutant loading from irrigated agriculture.
- Facilitate the development and implementation of salt and nutrient management plans (per SWRCB Recycled Water Policy, Resolution 2009-0011).
- Develop regional permitting strategy, in alignment with pending salt and nutrient management plans, to address salt and nutrient loading from municipal discharges and recycling projects (e.g., develop consistent permit requirements and support development of coastal brine disposal facilities).

Widespread Improvements in Agricultural Irrigation Efficiency and Management

The Central Coast has approximately 435,000 acres of irrigated agriculture, much of it intensively cropped nearly year-round, making it the third largest land use in the region, after open space and rangeland. Irrigated agriculture is the largest user/pumper of groundwater within the agricultural areas of the region, and contributes the largest fraction of return flows to both surface water and groundwater. Improved irrigation management can reduce off-site movement of water that carries pollutants to surface and groundwater, reduce erosion and sedimentation, and reduce overdraft of groundwater basins.

- Improve water use measurement
- Improve irrigation scheduling, such as through expanded use of climate information (CIMIS)
- Increase knowledge of crop water needs

Riparian Buffer Zone Designation and Protection

Riparian lands adjacent to streams, lakes, or other surface water bodies that are adequately vegetated provide an important environmental protection and water resource management benefit.

- Implement specifications for the establishment, protection, and maintenance of riparian vegetation
- Adopt a Basin Plan amendment for riparian protection
- Adopt local ordinances protecting riparian areas
- Improve statewide riparian and wetland protection policies
- Implement rangeland management measures

Widespread Implementation of Low Impact Development (LID)

Low Impact Development techniques, such as increasing perviousness and creating swales and vegetated areas to allow increased infiltration of rainwater, can improve water quality by reducing pollution being transported to streams and coastal areas (e.g. bacteria, pesticides, and fertilizers) and increasing recharge of clean groundwater.

- Adopt local ordinances requiring LID
- Establish standards for hydromodification
- Expand the Central Coast Low Impact Development Initiative

Widespread Implementation of Urban Water Conservation

Urban water conservation has the potential to improve water quality by reducing basin overdraft/seawater intrusion in some areas and eliminating summer flows that carry pollutants to surface waters.

- Increase use of incentives to encourage rapid adoption of water saving technologies (e.g., toilet exchange programs, credits for drought-tolerant landscaping, grey water retrofits, rainwater collection systems, etc.)

The recommendations, implementation actions and accomplishments of the Central Coast Water Board identify solutions and actively address the water quality challenges we face. Integrated Regional Water Management, the Central Coast Ambient Monitoring Program and the Cooperative Monitoring Program, and the Low Impact Development Initiative are just a few examples of how coordinating with, and leveraging both internal and external resources has the potential to achieve tangible results on a regional scale.

[PLACEHOLDER: Integrated Flood Planning content to be developed]

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[PLACEHOLDER: Groundwater content to be developed]

[Contains

- References for all cited materials in the text.]

[PLACEHOLDER: Integrated Flood Planning content to be developed]

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* [The Western Regional Climate Center (WRCC) has temperature and precipitation data for the past century. Through an analysis of National Weather Service Cooperative Station and PRISM Climate Group gridded data, scientists from the Western Regional Climate Center have identified 11 distinct regions across the state for which stations located within a region vary with one another in a similar fashion. These 11 climate regions are used when describing climate trends within the state (Abatzoglou, J.T., et al, 2009). DWR's hydrologic regions do not correspond directly to WRCC's climate regions. A particular hydrologic region be covered by more than one climate region, and hence have different climate trends in different areas. For the purpose of this regional report, climate trends of overlapped climate regions are considered to be relevant trends for respective portions of the overlapping hydrologic region.]

[PLACEHOLDER: Groundwater content to be developed]

[Contains

- Additional information regarding methods and assumptions related to the groundwater-related data and analyses provided.]

Personal Communications

Table CC-1 Summary of Proposition 84 and Proposition 1E IRWM Grant Awards to the Central Coast Region in 2011

IRWM	Prop. 84 Round 1 2011 Planning Award	Prop 84 Round 1 2011 Impl. Award	Prop 1E Round 1 2011 SWFM Award
Greater Monterey County			
Regional Planning Grant to Complete an IRWM Plan for the new Greater Monterey County Region	$755,264		
City of Soledad-Implementation		$4,139,000	
Monterey Peninsula, Carmel Bay, So. Monterey Bay			
Work Plan to Update the Monterey Peninsula, Carmel Bay, and South Monterey Bay Integrated Regional Water Management Plan	$995,000		
Pajaro River Watershed			
Pajaro River Watershed Integrated Regional Water Management Plan Update	$996,170		
San Luis Obispo			
SLO County Flood Control and Water Conservation District-Implementation		$10,401,000	
Flood Control Zone 1/1A Waterway Management Program, Alternative 3a Project			$2,797,000
Santa Barbara Countywide			
Santa Barbara County IRWM Plan 2012	$555,737		
Santa Barbara County Water Agency-Implementation		$3,000,996	
Santa Cruz			
Santa Cruz IRWM Prop 84 Regional Planning Grant	$999,750		

Table CC-2 Critical Wildlife Species List for the Central Coast

Scientific Name	Common Name	Federal Status [1]	State Status [2]
Invertebrates			
Branchinecta longiantenna	Longhorn fairy shrimp	FE	
Branchinecta lynchi	Vernal pool fairy shrimp	FT	
Cicindela ohlone	Ohlone tiger beetle	FE	
Euphilotes enoptes smithi	Smith's blue butterfly	FE	
Euphydryas editha bayensis	Bay checkerspot butterfly	FT	
Euproserpinus euterpe	Kern primrose sphinx moth	FT	
Helminthoglypta walkeriana	Morro shoulderband snail	FE	
Polyphylla barbata	Mount Hermon June	FE	
Trimerotropis infantilis	Zayante band-winged grasshopper	FE	
Fish			
Eucyclogobius newberryi	Tidewater goby	FE	
Gasterosteus aculeatus williamsoni	Unarmored threespine stickleback	FE	SE
Oncorhynchus	Southern steelhead - S. CA coast DPS	FE	
Oncorhynchus kisutch	Coho salmon - Central CA coast ESU	FE	SE
Oncorhynchus mykiss irideus	Steelhead - Central CA coast DPS	FT	
Oncorhynchus mykiss irideus	Steelhead - S./Central CA coast DPS	FT	
Bird			
Aquila chrysaetos	Golden eagle	FP	FP
Brachyramphus marmoratus	Marbled murrelet	FT	SE
Buteo swainsoni	Swainson's hawk		ST
Charadrius alexandrinus nivosus	Western snowy plover	FT	
Coccyzus americanus occidentalis	Western yellow-billed cuckoo		SE
Elanus leucurus	White-tailed kite	FP	FP
Empidonax traillii extimus	Southwestern willow flycatcher	FE	SE
Gymnogyps californianus	California condor	FE	SE
Haliaeetus leucocephalus	Bald eagle		SE
Laterallus jamaicensis coturniculus	California black rail		ST
Passerculus sandwichensis beldingi	Belding's savannah sparrow		SE
Rallus longirostris levipes	Light-footed clapper rail	FE	SE
Rallus longirostris obsoletus	California clapper rail	FE	SE
Riparia riparia	Bank swallow		ST
Sternula antillarum browni	California least tern	FE	SE
Vireo bellii pusillus	Least Bell's vireo	FE	SE
Mammal			
Ammospermophilus nelsoni	Nelson's antelope squirrel		ST
Dipodomys heermanni morroensis	Morro Bay kangaroo rat	FE	SE
Dipodomys ingens	Giant kangaroo rat	FE	SE
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	FE	SE
Eumetopias jubatus	Steller sea-lion	FT	

Scientific Name	Common Name	Federal Status [1]	State Status [2]
Vulpes macrotis mutica	San Joaquin kit fox	FE	ST
Amphibian			
Ambystoma californiense	California tiger salamander	FT	ST
Ambystoma macrodactylum croceum	Santa Cruz long-toed salamander	FE	SE
Anaxyrus californicus	Arroyo toad	FE	
Rana draytonii	California red-legged frog	FT	
Reptile			
Gambelia sila	Blunt-nosed leopard lizard	FE	SE, FP

Notes: KEY: FP Fully Protected FE Federally Endangered FT Federally Threatened SE State Endangered ST State Threatened SR State Rare ESU Evolutionary Significant Unit DPS Distinct Population Segment [1] website reference [2] website reference

Table CC-3 Critical Plant Species List for the Central Coast

Scientific Name	Common Name	Federal Status [1]	State Status [2]	CNPS Rank [3]	Scientific Name	Common Name	Federal Status [1]	State Status [2]	CNPS Rank [3]
Ancistrocarphus keilii	Santa Ynez groundstar			1B.1	Clarkia speciosa ssp. immaculata	Pismo clarkia	FE		1B.1
Arctostaphylos crustacea ssp. eastwoodiana	Eastwood's brittle-leaf manzanita			1B.1	Cordylanthus rigidus ssp. littoralis	Seaside bird's-beak		SE	1B.1
Arctostaphylos morroensis	Morro manzanita		ST	1B.1	Deinandra halliana	Hall's tarplant			1B.1
Arctostaphylos ohloneana	Ohlone manzanita			1B.1	Deinandra increscens ssp. villosa	Gaviota tarplant	FE	SE	1B.1
Arctostaphylos pajaroensis	Pajaro manzanita			1B.1	Dithyrea maritima	Beach spectaclepod		ST	1B.1
Arctostaphylos purissima	La Purisima manzanita			1B.1	Dudleya abramsii ssp. setchellii	Santa Clara Valley dudleya	FE		1B.1
Arctostaphylos tomentosa ssp. daciticola	Dacite manzanita			1B.1	Dudleya blochmaniae ssp. blochmaniae	Blochman's dudleya			1B.1
Arenaria paludicola	Marsh sandwort	FE	SE	1B.1	Ericameria fasciculata	Eastwood's goldenbush			1B.1
Astragalus tener var. titi	Coastal dunes milk-vetch	FE	SE	1B.1	Eriodictyon altissimum	Indian Knob mountainbalm	FE	SE	1B.1
California macrophylla	Round-leaved filaree			1B.1	Eriogonum nudum var. decurrens	Ben Lomond buckwheat			1B.1
Calycadenia villosa	Dwarf calycadenia			1B.1	Eriophyllum lanatum var. hallii	Fort Tejon woolly sunflower			1B.1
Calyptridium parryi var. hesseae	Santa Cruz Mtns. pussypaws			1B.1	Eryngium aristulatum var. hooveri	Hoover's button-celery			1B.1
Calystegia sepium ssp. binghamiae	Santa Barbara morning-glory			1B.1	Erysimum menziesii ssp. menziesii	Menzies' wallflower	FE	SE	1B.1
Camissonia benitensis	San Benito evening-primrose		ST	1B.1	Erysimum teretifolium	Santa Cruz wallflower	FE	SE	1B.1
Castilleja ambigua ssp. insalutata	Pink johnny-nip			1B.1	Erysimum yadonii	Yadon's wallflower	FE	SE	1B.1
Caulanthus amplexicaulis var. barbarae	Santa Barbara jewel-flower			1B.1	Eschscholzia rhombipetala	Diamond-petaled CA poppy			1B.1
Caulanthus californicus	California jewel-flower	FE	SE	1B.1	Hoita strobilina	Loma Prieta hoita			1B.1
Ceanothus ferrisiae	Coyote ceanothus	FE		1B.1	Holocarpha macradenia	Santa Cruz tarplant	FT	SE	1B.1
Centromadia parryi ssp. australis	Southern tarplant			1B.1	Horkelia cuneata ssp. puberula	Mesa horkelia			1B.1

Scientific Name	Common Name	Federal Status [1]	State Status [2]	CNPS Rank [3]	Scientific Name	Common Name	Federal Status [1]	State Status [2]	CNPS Rank [3]
Chlorogalum purpureum var. purpureum	Santa Lucia purple amole		ST	1B.1	Horkelia cuneata ssp. sericea	Kellogg's horkelia			1B.1
Chlorogalum purpureum var. reductum	Camatta Canyon amole		ST	1B.1	Lasthenia conjugens	Contra Costa goldfields	FE		1B.1
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	FE		1B.1	Lasthenia glabrata ssp. coulteri	Coulter's goldfields			1B.1
Chorizanthe robusta var. robusta	Robust spineflower	FE		1B.1	Layia carnosa	Beach layia	FE	SE	1B.1
Chorizanthe robusta var. hartwegii	Scotts Valley spineflower	FE		1B.1	Layia discoidea	Rayless layia			1B.1
Cirsium scariosum var. loncholepis	La Graciosa thistle	FE	ST	1B.1	Layia heterotricha	Pale-yellow layia			1B.1
Legenere limosa	Legenere			1B.1	Piperia yadonii	Yadon's rein orchid	FE		1B.1
Leptosiphon croceus	Coast yellow leptosiphon			1B.1	Plagiobothrys diffusus	San Francisco popcorn-flower		SE	1B.1
Leptosiphon rosaceus	Rose leptosiphon			1B.1	Polygonum hickmanii	Scotts Valley polygonum	FE	SE	1B.1
Lupinus nipomensis	Nipomo Mesa lupine	FE	SE	1B.1	Potentilla hickmanii	Hickman's cinquefoil	FE	SE	1B.1
Lupinus tidestromii	Tidestrom's lupine	FE	SE	1B.1	Quercus dumosa	Nuttall's scrub oak			1B.1
Madia radiata	Showy golden madia			1B.1	Sanicula maritima	Adobe sanicle		SR	1B.1
Malacothamnus abbottii	Abbott's bush-mallow			1B.1	Streptanthus albidus ssp. albidus	Metcalf Canyon jewel-flower	FE		1B.1
Mimulus fremontii var. vandenbergensis	Vandenberg monkeyflower			1B.1	Stylocline masonii	Mason's neststraw			1B.1
Nasturtium gambelii	Gambel's water cress	FE	ST	1B.1	Suaeda californica	California seablite	FE		1B.1
Navarretia fossalis	Spreading navarretia		ST	1B.1	Trifolium buckwestiorum	Santa Cruz clover			1B.1
Navarretia prostrata	Prostrate vernal pool navarretia			1B.1	Trifolium polyodon	Pacific Grove clover		SR	1B.1
Pentachaeta bellidiflora	White-rayed pentachaeta	FE	SE	1B.1	Trifolium trichocalyx	Monterey clover	FE	SE	1B.1
Pinus radiata	Monterey pine			1B.1	Tropidocarpum capparideum	Caper-fruited tropidocarpum			1B.1

Notes: FE Federally Endangered FT Federally Threatened SE State Endangered ST State Threatened SR State Rare CNPS – California Native Plant Society Rank CA Endemic - native or indigenous to CA

Regional Endemic - native to region [1] website reference [2] website reference [3] http://www.rareplants.cnps.org/

Table CC-4 Population Estimates for the Central Coast from 2000 to 2010

County	2000	2002	2004	2006	2008	2010
San Mateo	415	406	402	394	393	388
Santa Clara	90,110	93,439	95,397	97,094	100,665	101,945
San Benito	52,809	54,872	55,299	54,951	54,949	55,200
Santa Cruz	254,815	255,890	254,986	255,107	258,737	262,552
Monterey	399,392	407,440	411,544	406,935	409,387	415,108
San Luis Obispo	245,696	252,604	257,045	260,873	265,505	269,333
Santa Barbara	397,877	404,794	410,357	412,271	418,309	423,740
Total for Hydrologic Region	1,441,114	1,469,445	1,485,030	1,487,625	1,507,945	1,528,266

Source: Population estimates are from CA Dept. of Finance. Population estimates include those portions of San Mateo and Santa Clara counties which are within the Central Coast Hydrologic Region.

Table CC-5 Population Estimates and Decadal Projections for the Central Coast

	Estimate		Projections			
	2000	**2010**	**2020**	**2030**	**2040**	**2050**
State of California	34,000,835	37,312,510	40,817,839	44,574,756	47,983,659	51,013,984
Monterey	402,854	415,758	436,275	459,359	483,868	511,956
San Benito	53,635	55,341	57,138	59,259	61,032	62,217
San Luis Obispo	247,724	269,710	290,132	311,388	328,786	344,805
Santa Barbara	399,874	424,223	448,986	469,070	485,777	501,283
Santa Cruz	255,869	263,132	270,776	278,008	281,053	283,108
Total for Hydrologic Region	1,359,956	1,428,164	1,503,307	1,577,084	1,640,515	1,703,370

Note: Population estimates and projections prepared by Demographic Research Unit, CA Department of Finance, May 2012; does not include Santa Clara or San Mateo Counties. From: http://www.dof.ca.gov/research/demographic/reports/projections/interim/view.php.

Table CC-6 Disadvantaged Communities within the Central Coast

Community	Type	Population	MHI	Households
Amesti	CDP	3,339	$47,483	1,007
Boronda	CDP	1,778	$37,295	415
Casmalia	CDP	400	$42,692	98
Castroville	CDP	5,490	$44,286	1,300
Chualar	CDP	1,337	$48,516	287
Cuyama	CDP	51	$37,500	10
Freedom	CDP	2,816	$48,688	807
Guadalupe	City	6,770	$42,978	1,888
Isla Vista [1]	CDP	23,776	$30,087	5,078
Lompoc	City	41,864	$46,932	13,420
New Cuyama	CDP	413	$45,313	147
Oceano	CDP	7,883	$39,843	2,920
Pajaro	CDP	2,670	$36,094	614
Paradise Park	CDP	456	$40,134	235
San Ardo	CDP	665	$48,000	150
San Luis Obispo [2]	City	44,959	$40,812	19,734
San Miguel	CDP	2,695	$42,176	766
San Simeon	CDP	547	$43,092	221
Twin Lakes	CDP	5,005	$48,693	2,249
Watsonville	City	49,580	$46,675	13,805

Notes: [1] CDP includes UC Santa Barbara [2] City includes Cal Poly SLO

CDP = Census-Designated Place MHI = Median Household Income

Source: DWR website: http://www.water.ca.gov/irwm/integregio_resourceslinks.cfm. Disadvantaged Communities (DAC) Mapping Tool - GIS Files - Census Places

Table CC-8 City of Santa Cruz Water Dept. 2009

City of Santa Cruz Water Department - 2009		
Production by Source of Supply:	**Million Gallons**	**Acre Feet**
Coastal Sources	814	2,499
San Lorenzo River	2,010	6,170
Loch Lomond	296	908
Total	**3,121**	**9,577**

Table CC-23 Flood Exposure in the Central Coast Hydrologic Region Exposures to the 100-Year and 500-Year Flood Events

Segment exposed	1% (100-year) Floodplain	0.2% (500-year) Floodplain
Population	92,700, 6%	426,900, 29%
Structure and Content Value	$10.3 billion	$36.3 billion
Crop Value	$564.4 million	$689.3 million
Crops (acres)	123,600	146,300
Tribal Lands (acres)	0	0
Essential Facilities (count)	50	230
High Potential-Loss Facilities (count)	24	32
Lifeline Utilities (count)	23	32
Transportation Facilities (count)	275	412
Department of Defense Facilities (count)	5	5
State and Federal Threatened, Endangered, Listed ,and Rare Plants [a]	202	204
State and Federal Threatened, Endangered, Listed ,and Rare Animals [a]	111	112

Source: SFMP California's Flood Future Report

[a] Many Sensitive Species have multiple occurrences throughout the state and some have very large geographic footprints that may overlap more than one analysis region. As a result, a single Sensitive Species could be counted in more than one analysis region. Because of this the reported statewide totals will be less than the sum of the individual analyses regions.

Table CC-24 Actions/Initiatives Implementing CWP RMS'

Selected CA Water Plan Update 2009 Resource Management Strategies (RMS)	Central Coast Regional Water Quality Control Board Actions/Strategies that Support Selected CA Water Plan RMS
Agricultural Lands Stewardship	• Developing and implementing TMDLs for pesticides such as in the Salinas River. • Implementing the agricultural regulatory program to address sources of nitrates, pesticides, and sediment from irrigated agricultural operations. • Use of LID, Municipal Storm water Program, increased sediment management on farms required by Ag Order.
Agricultural Water Use Efficiency	• Requiring irrigation efficiency and improved nutrient management in the recently adopted Conditional Waiver for Irrigated Lands (Ag Order) to reduce demand for groundwater and reduce movement of pollutants such as fertilizers and pesticides into surface and groundwater.
Drinking Water Treatment and Distribution	• Consolidation of small water systems, replacement of wells in rural areas impacted by nitrates is high priority.
Economic Incentives (Loans, Grants, Water Pricing)	• Providing grant funding for projects that implement irrigation efficiency on agricultural lands.
Groundwater Remediation/Aquifer Remediation	• Developing a Groundwater Assessment and Protection (GAP) component of the Central Coast Ambient Monitoring Program (CCAMP), intended to facilitate ongoing regional-scale groundwater monitoring and assessment. Data generated from the program will be readily available to the general public and other agencies via State Water Board's GAMA • GeoTracker database. • Site cleanup and underground tank programs require cleanup; long-term nitrate loading reduction requirements in Ag Order is high priority for groundwater protection.
Matching Water Quality to Use	• Recycled water use for agricultural irrigation to reduce pumping is important component of addressing seawater intrusion in the Salinas Valley; expansion of such uses is priority.
Pollution Prevention	• Developing and implementing TMDLs for fecal indicator bacteria for the protection of water-contact recreation such as in the San Lorenzo River and other water bodies in Santa Cruz County, and commercial shellfish harvesting such as in the Morro Bay estuary. • Investigating the extent of nitrate in groundwater and the number and location of rural residents who are at risk, and ensuring they are notified of the risk and their options. • Implementing the agricultural regulatory program to address sources of nitrates, pesticides, and sediment from irrigated agricultural operations. • Sewering in areas of high septic tank density still underway (Los Osos), more oversight of septic systems is priority.
Recharge Area Protection	• Priority for Water Board Basin Plan Amendment
Recycled Municipal Water	• Underway in several areas, potential for expansion; use for urban and agricultural irrigation.
Salt and Salinity Management	• Including salt limits in individual waste discharge requirements and the Ag Order • Working with local agencies to develop salt and nutrient management plans (SNMPs) that include seawater intrusion in applicable basins for Board consideration by February 2014

Selected CA Water Plan Update 2009 Resource Management Strategies (RMS)	Central Coast Regional Water Quality Control Board Actions/Strategies that Support Selected CA Water Plan RMS
Urban Runoff Management	• Establishing the Central Coast Low Impact Development Initiative http://www.centralcoastlidi.org/Central_Coast_LIDI/Home.html • Leading the Central Coast Joint Effort for Hydromodification Control and Low Impact Development (LID) to protect watershed processes such as surface water flow, groundwater recharge, and sediment transport that are potentially impacted by municipal storm water runoff.

Figure CC-4 Central Coast Strawberry Production

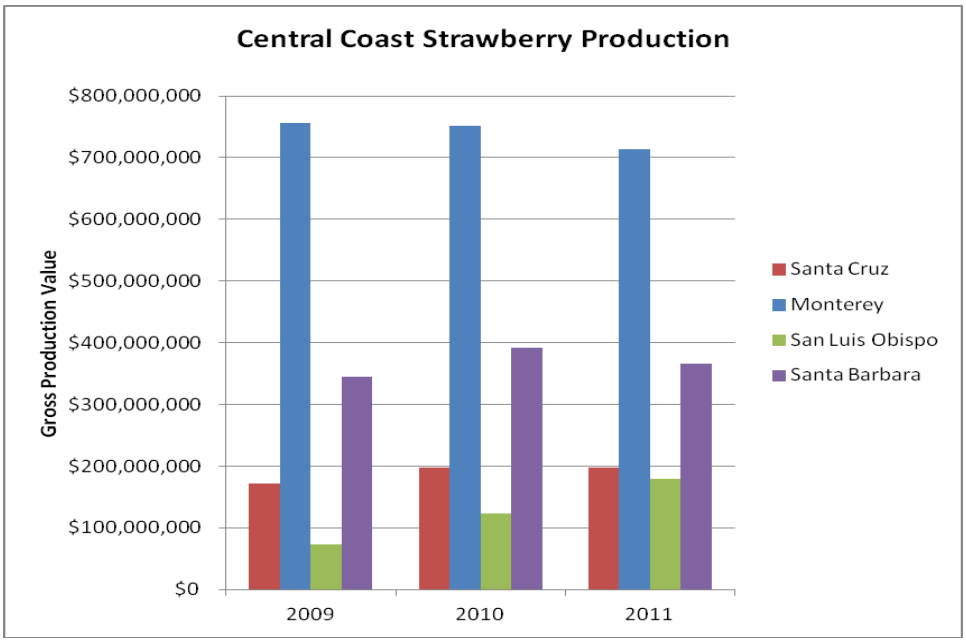
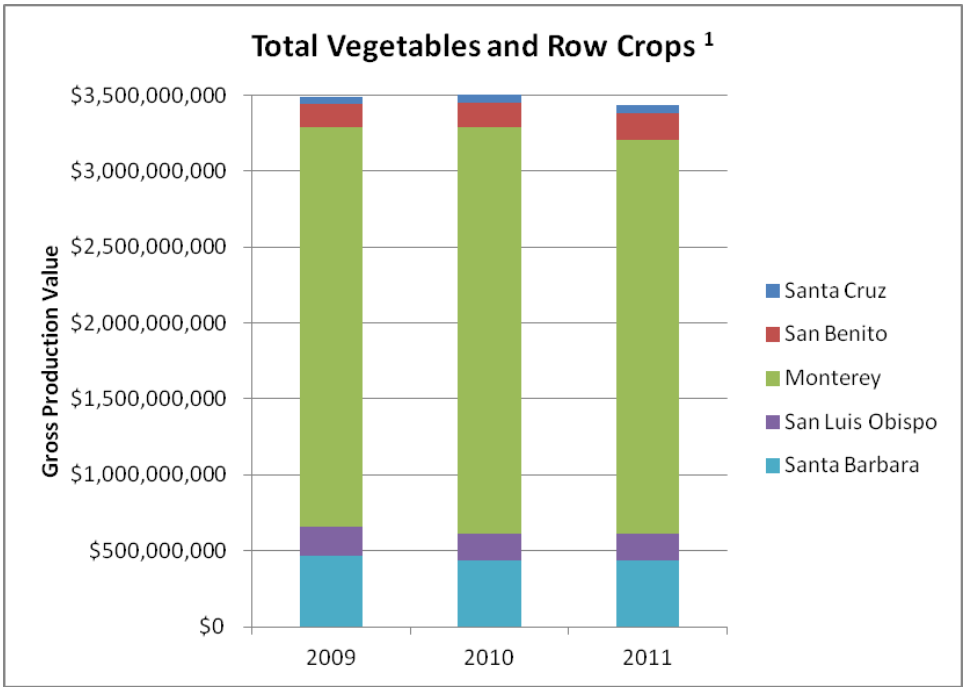
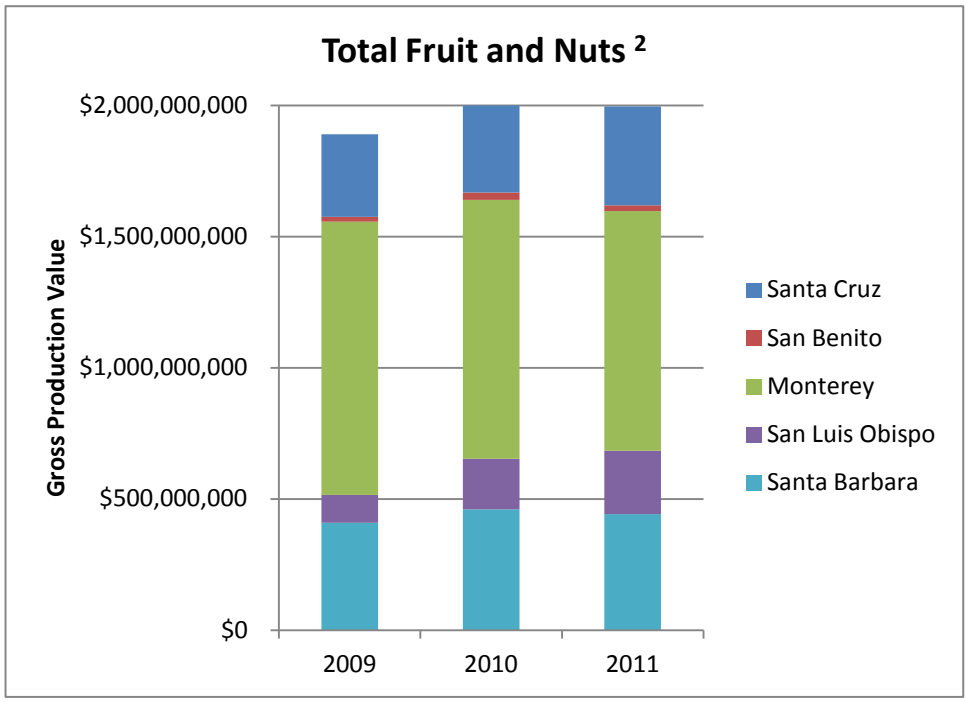


Figure CC-5 Central Coast Total Vegetables and Row Crops



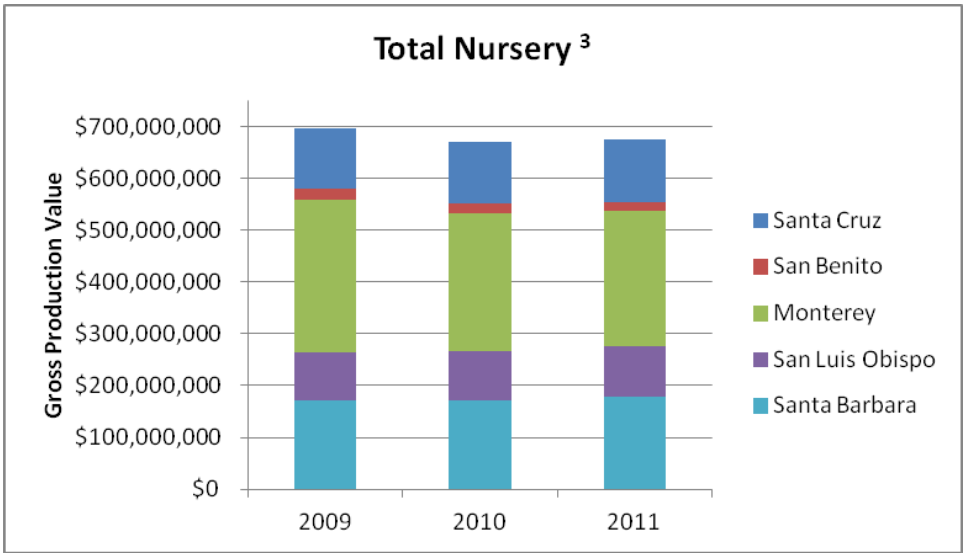
1 Total vegetable and row crops can include: Arugula, Anise, Artichokes, Asparagus, Beans, Beets, Bok Choy, Borage, Broccoli, Brussel Sprouts, Cabbage, Carrots, Cantaloupe, Cauliflower, Celery, Chicory, Chard, Chili Peppers, Cilantro, Collards, Corn, Cucumbers, Daikon, Dandelion, Dill, Eggplant, Endive, Escarole, Fennel, Garlic, Green Onions, Garbanzo Beans, Herbs, Kale, Kohlrabi, Leeks, Lettuces, Melons, Mushrooms, Mizuna, Mustard, Okra, Onions, Parsley, Parsnips, Peas, Pepper, Potatoes, Pumpkins, Radicchio, Radishes, Rutabagas, Shallots, Spinach, Squash, Sweet Corn, Tomato, Tomatillo, Turnips, and Watermelon.

Figure CC-6 Central Coast Total Fruit and Nuts



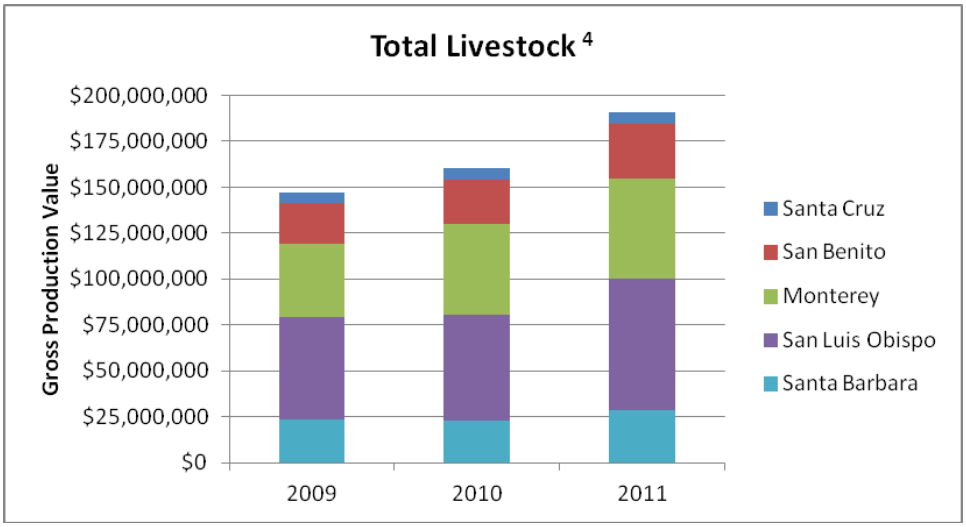
2 Total fruit and nuts can include: Almonds, Apples, Apricots, Asian Pears, Avocados, Blackberries, Blueberries, Cherries, Feijoas, Figs, Grapefruit, Kiwis, Lemons, Limes, Mandarin Oranges, Navel Oranges, Nectarines, Olives, Passion Fruit, Peaches, Pears, Persimmons, Pistachios, Plums, Pluot, Pomegranates, Prunes, Raspberries, Specialty Citrus, Table Grapes, Tangerines, Table Grapes, and Walnuts.

Figure CC-7 Central Coast Total Nursery



3 Total nursery can include: Aquatic plants, Bulbs, Cacti, Christmas trees, Farm stock transplants, Flowers, Flower seeds, Fruit-Nut trees, Herbs, Indoor potted plants, Landscape plants, Propagative plants, Scion wood, Specialty plants, Succulents, and Turf.

Figure CC-8 Central Coast Total Livestock



4 Total Livestock can include: All cattle, chicken, eggs, goats, hogs, lambs, milk, turkey, and wool.

Figure CC-9 Central Coast Acres of Wine Grapes over Time

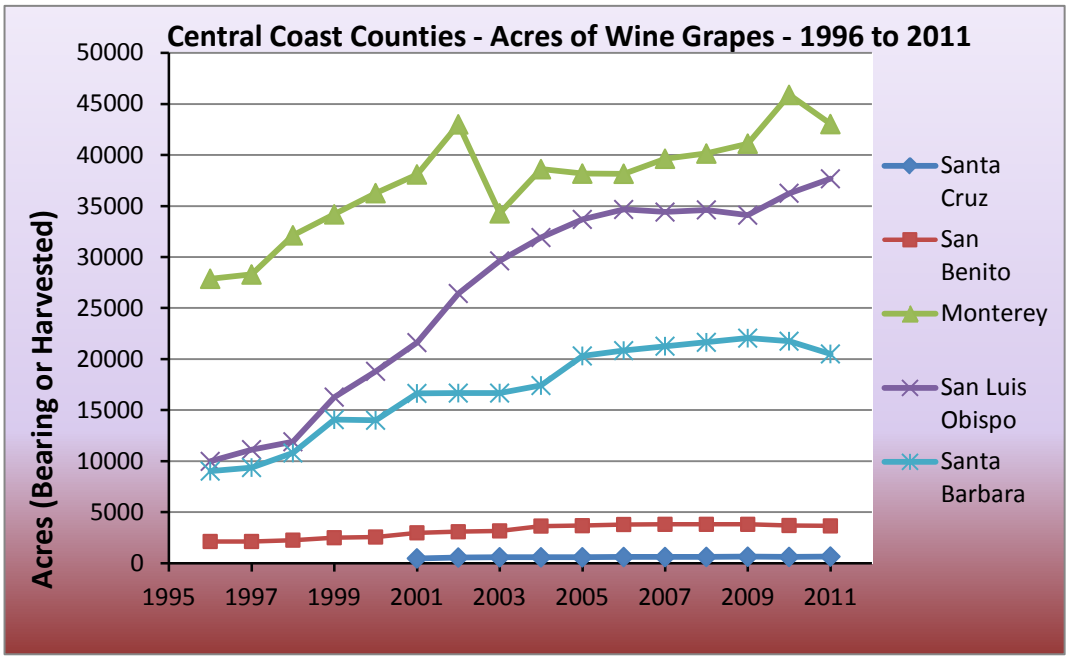


Figure CC-10 Central Coast Hydrologic Units and Monitoring Sites

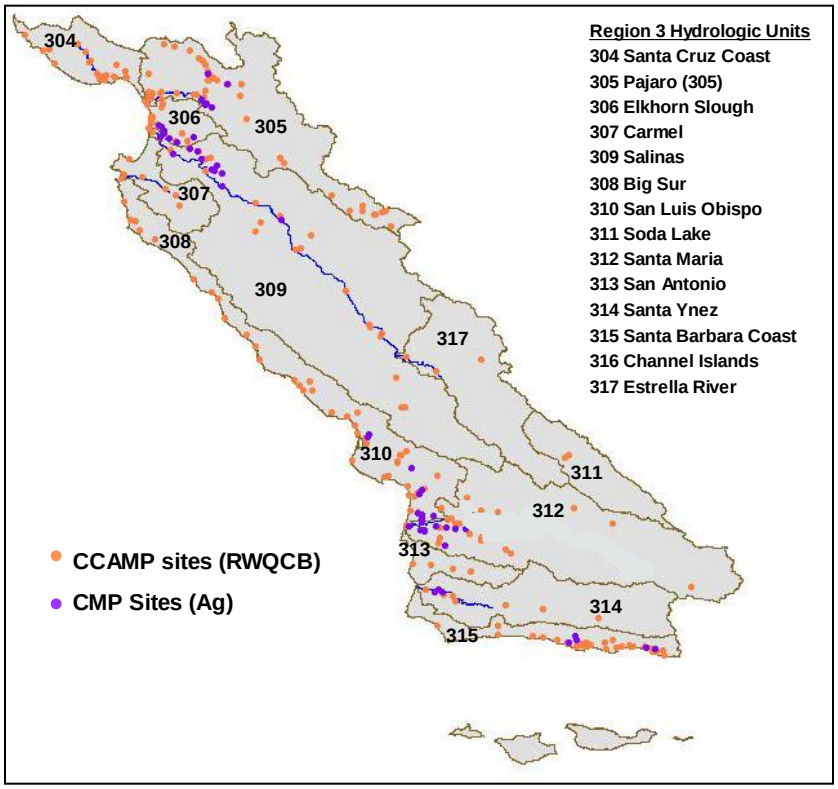


Figure CC-11 Central Coast Surface Water Quality Index using Multiple Parameters

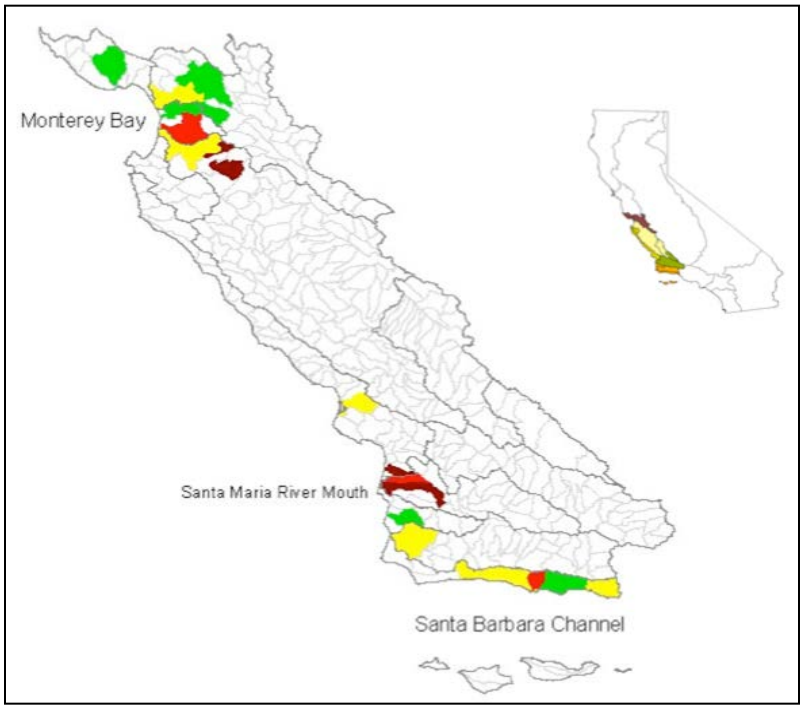
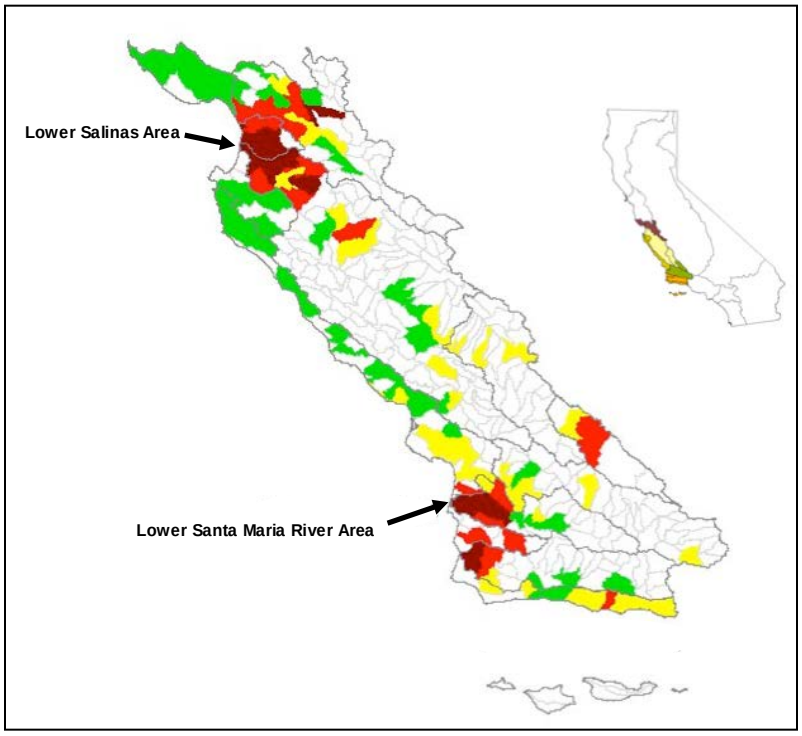


Figure CC-12 Central Coast Surface Water Quality Toxicity Index



Color scoring indicates surface water quality as follows: green = good, yellow = slightly impacted, red = impacted, and dark red = severely impacted.

Box CC-1 **Explanation of Federal- and State-listed Plant and Wildlife Ranking/Determinations**

The Federal Endangered Species Act (ESA) requires all federal agencies to consider listed species in their planning efforts and to take positive actions to further the conservation of these species. The ESA is jointly administered by the U.S. Fish and Wildlife Service (USFWS) for terrestrial and freshwater species, and the National Marine Fisheries Service (NMFS) for marine and anadromous species. It requires Federal agencies to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species. The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend.

When evaluating a species for listing, the FWS considers five factors: 1) damage to, or destruction of, a species' habitat; 2) overutilization of the species for commercial, recreational, scientific, or educational purposes; 3) disease or predation; 4) inadequacy of existing protection; and 5) other natural or manmade factors that affect the continued existence of the species. When one or more of these factors imperils the survival of a species, the FWS takes action to protect it, and is required to base its listing decisions on the best scientific information available. The ESA prohibits the unauthorized taking, possession, sale, and transport of endangered species.

The California Endangered Species Act (CESA) is the most comprehensive of the state acts. Modeled after the federal act, it provides a mechanism for listing species as threatened or endangered, and prohibits the taking of or trafficking in listed plant and animal species. In addition, CESA emphasizes early consultation with the CA Department of Fish and Game 1) to avoid potential impacts to rare, endangered, and threatened species, and 2) to develop appropriate mitigation planning to offset project caused losses of listed species.

CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats, threatened with extinction and those experiencing a significant decline which, if not halted, would lead to a threatened or endangered designation, will be protected, or preserved.

The mission of the **California Native Plant Society (CNPS)** is to conserve and protect California native flora. The CNPS maintains the Inventory of Rare and Endangered Plants of California (http://www.cnps.org/cnps/rareplants/inventory/index.php) to track the conservation status of hundreds of plant species, and the data are widely accepted as the standard for information on the rarity and endangerment status of California flora. The CNPS Inventory is a conservation tool that allows project proponents, local governments, and other agencies to better assess project related impacts on flora. The **California Environmental Quality Act (CEQA)** states that "special emphasis should be placed on environmental resources that are rare or unique to [a] region". The Department of Fish and Game Code mandates that plants listed in the CNPS Inventory as California Rare Plant Ranks 1A, 1B, and 2 be fully considered during preparation of environmental documents related to CEQA.